University of Alberta

Dechyoo Njik (MlVm-4) and the Traditional Landuse Patterns in the Southwestern Portion of the Old Crow Flats, Yukon Territory

by

Mélanie Fafard ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirement for the degree of Master of Arts

Department of Anthropology

Edmonton, Alberta
Fall 1999

National Library
of Canada

Acquisitions and
Bibliographic Services

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale
du Canada

Acquisitions et
services bibliographiques

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-46974-3

Canadä

University of Alberta

Library Release Form

Name of Author: Mélanie Fafard

Title of Thesis: Dechyoo Njik (MlVm-4) and the Traditional Landuse Patterns in the Southwestern Portion of the Old Crow Flats, Yukon Territory.

Degree: Master of Arts

Year this Degree Granted: 1999

Permission is hereby granted to the University of Alberta Library to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly, or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as hereinbefore provided, neither the thesis or any substantial portion thereof may be printed or otherwise reproduced in any material form whatever withouth the author's prior written permission.

Mélanie Fafard

10919 80th Avenue
Edmonton, Ab
T6G 0P9

Date submitted: June 25, 1999

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *Dechyoo Njik (MlVm-4) and the Traditional Landuse Patterns in the Southwestern Portion of the Old Crow Flats, Yukon Territory* by Mélanie Fafard in partial fulfillment of the requirements for the degree of Master of Arts in Anthropology.

R. LeBlanc

Dr. Raymond Le Blanc

Dr. David Lubell

Dr. Ian MacLaren

Date 25 June 1999

ABSTRACT

This thesis presents the results of the excavation and analysis of the Dechyoo Njik site (MlVm-4), a late prehistoric/historic camp located in the southwestern portion of the Old Crow Flats area, in the Northern Yukon Territory. The major objectives of this research are to document the range of activities in the Old Crow Flats and to improve the current understanding of pre-contact/contact period landuse patterns. Dechyoo Njik was used as a summer multi-functional location, for the gathering of various resources including fish, migratory waterfowl and muskrats. The artifact collection revealed the presence of a well integrated technological system, characterized by the manufacture of simple stone tools aimed at sustaining a complex bone and antler industry. The prehistoric component of the site is culturally affiliated with the Klo-kut Phase (from 700 B.P. up to the Historic Period), which was already identified at other sites in the Northern Yukon.

RÉSUMÉ

Cette thèse présente les résultats de fouilles et d'analyses effectuées à Dechyoo Njik (MlVm-4), un site archéologique préhistorique tardif et historique situé dans la partie sud-ouest des Old Crow Flats, au nord du Territoire du Yukon. Les principaux objectifs de cette investigation sont d'obtenir des informations concernant les différentes activités pratiquées dans les Old Crow Flats, et d'enrichir le savoir relatif aux schèmes d'exploitation du territoire pour les périodes de pré-contact et de contact. Dechyoo Njik était occupé pendant l'été pour l'acquisition de diverses ressources dont le poisson, les oiseaux migrateurs et les rats musqués. Les vestiges recueillis ont révélé la présence d'un système technologique bien intégré, caractérisé par la production de simples outils de pierre destinés à supporter une industrie complexe d'os et d'andouiller. Le composant préhistorique du site présente une affiliation culturelle avec la Phase Klo-kut (entre 700 après J.C. jusqu'à la Période Historique), déjà identifiée à d'autres locations dans le nord du Yukon.

ACKNOWLEDGEMENT

I would like to thank the following persons and institutions that directly or indirectly contributed to the realisation of this research project. I really appreciated the assistance and encouragement I received during all of my MA degree.

First of all, I wish to thank Dr. Raymond Le Blanc for accepting to act as my supervisor and for including me in his research project in the Northern Yukon Territory. Working in the Old Crow area was a unique opportunity for me; my experience in this fascinating country was truly stimulating and resulted in a growing interest for the prehistory of the Northern Yukon Territory and for human adaptation to subarctic and arctic environments. I am also grateful to Dr. Le Blanc for his patience and assistance all over the period of my MA degree.

I also want to thank the people from Old Crow for giving me the permission to perform an archaeological investigation on their territory and for showing interest in my project. Special thanks to Vernon Kaye and Tracy Capowski, who worked with the crew during the excavation of Dechyoo Njik and to Elders Charlie Peter Charlie, Steven Frost, Mary Kassi, Charlie Thomas and Peter Tizya, for their participation in the oral history interviews. I am also grateful to Hugh Charlie, who patiently introduced me to the Elders and helped with the logistic of the project.

I would like to acknowledge the assistance of the following organizations: the Social Sciences and Humanities Council of Canada (SSHRC), from which most of the funding for the archaeological investigation was provided; Polar Continental Shelf Project (PCSP), for contributing logistical support and helicopter transportation ; the Northern Scientific Training Program (NSTP) and the Northern Research Institute (NRI) for the financial support they provided for the realization an oral history project with elders from Old Crow during the fieldseason 1998.

Special thanks to Julie Esdale,who participated in the excavation, for her friendship and encouragements and to John Butt, who also worked at MlVm-4. And finally, thank to the members of my family, Roger, Claudette, Dominique and Simon, as well as to Gaël Jaunasse and Claudio Aporta, for their support and love.

TABLE OF CONTENTS

CHAPTER ONE. Introduction 1
Background 1
Objectives 2
Approach 3
Methods 3
Scope of Report 4

CHAPTER TWO. The Environmental and Cultural Context 7
Introduction 7
Part I: The Environmental Context 7
Geology and Physiography 7
  Climate 7
  Vegetation 8
  Fauna 8
    Mammals 8
    Birds 10
    Fish 10
Part II: The Cultural Context 11
  Introduction 11
  The Annual Cycle and Subsistence Strategy of the Vuntut Gwitchin 12
  Conclusion 18

CHAPTER THREE. The Physical Context of the Dechyoo Njik Site 19
General Description 19
Excavation Strategy 19
Stratigraphy 21
Chronology 24
Features 25
    Individual Hearths 25
    Hearths 25
    Hearths Area 25
    Ash Deposits 31
  Pits 31
    Refuse Pits 31
    Caches 32
  Depressions 35
Fire-Cracked Rock 35

CHAPTER FOUR. The Lithic Industries 37
Introduction 37
Descriptive and Analytical Approach 37
Part I: The Cryptocrystalline Industry 38
  Debitage 38
    Cores 39
    Flakes and Shatters 39
  Modified Flakes 43
  Bifaces 43
  Scrapers 44
  Pièces Esquillées 44
  Burin 45
  Microblade Core Tablet 45
Part II: The Coarse Stone Industry 49
  Tabular Bifaces 49
    Discussion 49
  Multi-Functional Celt-Like Object 53
  Grinding Tablets 53
  Miscellaneous 53
    Hematite Fragments 53
Conclusion 55

CHAPTER FIVE. The Bone and Antler Industry 59
Introduction 59
Part I: Core Reduction-Blank Production 60
  Bone Production By-Products 60
    Cores 60
    By-Products of Core Reduction 60
    Unmodified Blanks 60
    By-Products of Blank Shaping 61
  Antler Production By-Products 61
    By-Products of Blank Shaping 61
Part II: Products of Blank Shaping and Finishing 62
  Bone and Antler Projectile Points 62
    Unilaterally Barbed Bone Point 62
    Unilaterally Barbed Antler Point 62
    Unbarbed Bone Point 62
    Unbarbed Antler Points 62
    Blunt Antler Arrowhead 63
    Possible Bone and Antler Arrowhead Fragments 63

Leister Barbs 64
Bone and Antler Awls 64
Type I(c) Awls 64
Type II Awls 65
Type III Awls 65
Type IV Awls 66
Possible Bone and Antler Tools 66
Bone and Antler Worked Fragments 66
Conclusion 67

CHAPTER SIX. The Bark Industry, the Wood Remains and the Euro-Canadian Goods 73
The Bark Industry 73
Wood Remains 75
Euro-Canadian Artifacts 76
Glass Beads 76
Discussion 76
Clay Pipe Fragments 78
Gun Flint 80
Metal Artifacts 80
Metal Axe 80
Nail Fragment 80
Wire Section 80
Hand-Made Button 80
Metal Fragments 81
Copper Fragment 81
Summary 81

CHAPTER SEVEN Faunal Remains 84
Introduction 84
Methods 84
Quantitative Analysis 84
Discussion 85
Seasonality 89
Bone Alterations 90
Bone Frequencies 91
Spatial Distribution 97
Conclusion 97

CHAPTER EIGHT Summary, Comparisons and Conclusion 100
Introduction 100

Chronology 100
Function(s) and Seasonality 100
Technological System 101
Fishing Techniques 103
Relation with the Culture-Historical Model in the Northern Yukon 105
Dechyoo Njik and the Landuse Patterns during the Klo-kut Phase 110
Concluding Statement 111

REFERENCES CITED 113

LIST OF TABLES

Table Page

1. List of Metric and Non-Metric Attributes of the Features at MlVm-4 28
2. Summary of Debitage Type by Raw Material 40
3. Summary Weight (g) Statistics for Cores and Core Fragments 40
4. Summary Weight (g) Statistics for Flakes and Shatters 40
5. Distribution of Tabular Bifaces 51
6. Distribution of Surface Polish on Tabular Bifaces 51
7. Distribution of Red Ochre on Tabular Bifaces 51
8. Distribution of Metrical Attributes for Complete and Broken Tabular Bifaces 52
9. Distribution of Metrical Attributes for Fragments of Tabular Bifaces 52
10. Metric and Non-Metric Attributes of Hematite Fragments 54
11. Summary List of Bone and Antler Artifacts at MlVm-4 68
12. Summary of Bark Artifacts 73
13. Summary of Metric and Non-Metric Attributes for Bark Artifacts with Stitch Holes 74
14. Summary of Metric and Non-Metric Attributes for Various Categories of Bark Fragments 74
15. Distribution of Wooden Artifacts 75
16. List of Euro-Canadian Artifacts by Levels 77
17. Summary of Metrical Observations for the Various Classes of Glass Beads 79
18. Summary of the Faunal Assemblage by Classes 84
19. Summary of the Faunal Assemblage by Taxa 87
20. Bones Used in the Determination of the Composite MNI 88
21. Summary of Bone Alterations 91
22. Bird Element Summary 94
23. Fish Element Summary 95
24. Muskrat Element Summary 96
25. Number of Bones by Classes Contained in Each Unit of Excavation 99
26. Comparisons of Metrical Attributes for the Modified Flakes from the

Klo-kut, the Rat Indian Creek and the Dechyoo Njik Sites 108

27. Comparisons of Metrical Attributes for the Scrapers from the Klo-kut Rat Indian Creek and Dechyoo Njik Sites 108

28. Comparisons of Metrical Attributes for the Tabular Bifaces from the Klo-kut, Rat Indian Creek and Dechyoo Njik Sites 108

29. Classes of Bone and Antler Artifacts Represented at the Klo-kut Rat Indian Creek and Dechyoo Njik Sites 109

LIST OF FIGURES

Figure Page

1. Map of the Middle Porcupine Area Showing the Location of the Archaeological Sites with a Klo-kut Component 6
2. Drawing of a Downstream Fish Trap by Laurence Charlie, a Gwitchin from Old Crow 15
3. Map of the Dechyoo Njik Site 22
4. Map Representing the Features from the 1983 and 1985 Excavations 26
5. Map Representing the Features from the 1997 Excavation 27
6. Frequency of Fire-Cracked Rock Mean Weight per Units 35
7. Density Distribution of Fire-Cracked Rock 36
8. Size Distribution of Cores and Core Fragments 41
9. Size Distributions for Debitage Classes 41
10. Reduction Stages Distributions for Bifacial and Core Reduction Flakes 42
11. Density Distribution of Faunal Remains by Classes 98

LIST OF PLATES

Plate Page

1. The Dechyoo Njik Site (MIVm-4) 20
2. Deformation of the Soil Matrix by Frost Cracks 23
3. Hearth Feature Displaced by a Frost Crack 30
4. Multi-Functional Refuse Pit (N12E7) 33
5. Cache Feature (N9E9) 34
6. Chert Core Pebbles 46
7. Chert Biface Fragment, Scrapers and Microblade Core Tablet 47
8. Chert Pièces Esquillées 48
9. Tabular Bifaces 57
10. Coarse Stone Tools 58
11. By-Products of Bone and Antler Reduction 69
12. Bone and Antler Projectile Points 70
13. Bone and Antler Projectile Points 71
14. Bone and Antler Awls 72
15. Euro-Canadian Artifacts 83

CHAPTER 1

Introduction

Background

Although the Late Prehistory of the northern Yukon is the best documented portion of the local culture-historical sequence for this area, our understanding of the subsistence strategies and settlement patterns of the people from that time is still fairly limited. In 1966, an excavation directed by W.N. Irving at the Klo-kut site (MjVl-1), a large and well-stratified site located on the Porcupine River about 10 km north above the village of Old Crow, was the first formal investigation in the area at a late prehistoric location (Figure 1). In 1967 and 1968, a larger scale excavation was undertaken at the same site by R.E. Morlan. The site appeared to be an important late spring/early summer location for intercepting caribou during their northward migration. It has yielded evidence of continuous occupation from 1 200 B.P. to the Historic Period (around 100 B.P.), by the ancestors of the present Vuntut Gwitchin. Caribou hunting constituted the main subsistence activity of the Gwitchin people, and caribou is still a major component of their diet today (Wein and Freeman, 1995: 168). The excavation of the Klo-kut site, along with minor investigations at several other locations in the Middle Porcupine, allowed Morlan to define a historical sequence for the late prehistory of the area (Morlan 1973).

From 1976 to 1978, another study carried on by R. Le Blanc also largely contributed to the understanding of the Late Prehistoric Period in the middle Porcupine area (1984). Le Blanc's work focused on the analysis and interpretation of Rat Indian Creek (MjVg-1), a site situated on the Porcupine River about 90 km upriver north of Old Crow (Figure 1). The site was first tested by Richard Morlan and Jacques Cinq-Mars, and was included in Morlan's report on the late prehistory of the middle Porcupine drainage (1973). Like Klo-kut, the Rat Indian Creek site was a major caribou hunting location. The camp, which is located on an alluvial terrace, has very well defined stratigraphy including seven distinct cultural levels. The uppermost level pertained to the Historic Period while the others contained evidence of successive pre-contact occupations. The oldest component at the Rat Indian Creek site appeared to be much older than the earliest occupation at Klo-kut. Consequently, Le Blanc was able to refine the chronology of the Late Prehistoric Period in the northern Yukon. He placed the Late Prehistoric Period between 2 850 and 100 B.P. and subdivided it in two phases. The earlier, named the Old Chief Phase, was dated to between 2 850 and 1 250 B.P., while the Klo-kut Phase ranges between 1 250 B.P. to A.D. 1 850 (1984). Le Blanc also studied the manufacturing techniques of stone, antler and bone industries at Rat Indian Creek, thus providing a comprehensive model of technological analysis in order to learn about the tool making processes adopted by prehistoric people through time.

In 1983, a site (MlVm-4) was discovered on the southwestern portion of the Old Crow Flats, during a survey operation led by Jacques Cinq Mars and Raymond Le Blanc (Le Blanc 1986). The site was located at a distance of about 40 km north of the Porcupine River, at the confluence of Schaeffer Creek with another small creek leading to a lake (Figure 1). In 1985, Le Blanc (1986) returned to the site to conduct a limited testing operation. In the same year, the site was named Dechyoo *(goose with red bill and feet)* njik *(creek)* by Mr. Charlie Peter Charlie, an elder from Old Crow who took part in the investigation (ibid.). The results of the test excavations suggested that this location had been used as a fishing camp, most likely during the most recent part of the Late Prehistoric Period, as well as during the Historic Period (ibid.). On this basis, it appeared evident that a more extensive excavation of the site would contribute to a more complete picture of the late prehistory in the middle Porcupine drainage, since the knowledge we have of the Klo-kut Phase is almost completely based on two archaeological sites: Klo-kut and Rat Indian Creek. Moreover, both locations were occupied for the same purpose: caribou hunting. Although the importance of caribou in the Native subsistence strategy is not questioned, the activities of the modern Gwitchin, the ethnographic literature (Osgood 1970; Balikci 1963; Leechman 1954) , as well as the first historical accounts (Petitot 1970; Richardson 1967; Hodges 1910; Murray 1910; Dall 1890) strongly suggest that the prehistoric Gwitchin hunters did not exclusively rely on caribou and that fishing was also an important part of their subsistence strategy. Thus, the investigation of MlVm-4 would shed light on a largely unknown (from an archaeological point of view) facet of the late prehistoric land use patterns and subsistence activities in the Old Crow area.

The formal excavation of the site was completed during the summer 1997, as part of a larger archaeological project initiated by Le Blanc, which seeks to delineate the long-term human, land use patterns in the Porcupine River drainage in the northwestern portion of the Yukon Territory. One of the more specific objectives of this research project is to work on the pre- and post-contact archaeological sites located along small tributaries of the Old Crow River on the Old Crow Flats. This study, which presents the results of the three archaeological operations conducted at Dechyoo Njik, is a contribution to the achievement of those objectives.

Objectives

The primary purpose of this study is to document the range of activities in the Old Crow Flats and to improve the current understanding of the pre-contact/contact Period land use patterns. Several questions must be addressed in order to accomplish these objectives: the time span of the occupation of the Dechyoo Njik site; the nature of the occupations at this site, in terms of function(s) and seasonality; the specific technology associated with the activities carried on at the site; the way the site relates to the current culture-historical model for the interior northern Yukon; and the way the activities carried out at MlVm-4 were integrated in the subsistence strategy and the land use patterns of the Native people.

Approach

In this study an analogical approach is used for archaeological interpretation. In a broad sense, interpretation by analogy is "assaying any belief about non-observed behavior by referral to observed behavior which is thought to be relevant" (Asher 1961: 317).

Since the Old Crow Flats was occupied by the Vuntut Gwitchin when the Europeans first entered the area (Petitot 1970: 27; Dall 1890: 430), it is reasonable to assume that the late prehistoric record of this area represents the ancestors of this cultural group. Therefore, the analogies used for the interpretation of the Dechyoo Njik site can, in most cases, be inferred directly from information about the Vuntut Gwitchin contained in their oral history, the early historical accounts and the ethnographic literature. Direct historical analogy is considered more reliable than a discontinuous one, since:

> ... descriptions of the physical and cultural activities, institutions, and materials of the descendants of the people whose remains are being excavated are most likely to be analogous to the past activities, institutions, and materials in multiple (often linked) ways than are analogies derived from anywhere else (Watson in Gould and Watson 1982: 359).

The information from the different sources will be compared and, when possible, tested against the archaeological record. This method will help to ensure the veracity of the information used for the analogies, both by supporting the correlations and/or by revealing any existing discrepancy among the different sources of data.

Methods

The excavation in 1997 of the Dechyoo Njik site (MlVm-4) constitutes the main method used to collect direct information related to the late prehistoric and historic fishing activities in the Old Crow Flats area. The analysis of the material recovered during this excavation will help to answer the questions previously addressed in the section on objectives.

In order to make comparisons possible between the Dechyoo Njik assemblage and those from other late prehistoric and historic sites in the middle Porcupine, I have used standard descriptive categories and the analytical method developed by Le Blanc (1984) to study the technological processes involved in the manufacture of stone and osseous artifacts from Dechyoo Njik. This will also allow for comparisons between the technological procedures performed at sites located in different environments and serving a totally different purpose.

Part of the 1998 field season following the excavation of MlVm-4, was dedicated to the collection of oral tradition in the village of Old Crow. This investigation was aimed at recording specific information about the archaeological evidence collected at Dechyoo Njik, as well as more general information concerning traditional land use patterns of the Gwitchin. Until recently, Old Crow people followed an economic pattern such as their ancestors had. The village was established in 1912, but permanent, sedentary town-living did not occur for most of the population until the early 1960s. Still today, most people have muskratting, fishing or winter camps that they visit regularly. Thus, elders from Old Crow have a deep knowledge of the land and of how it was used by hunter-gatherers of the region before people settled permanently.

Three individual interviews were conducted in Old Crow, with Elders Mary Kassi, Charlie Thomas and Peter Tizya. In addition, a helicopter field trip was organized for an on-site interview at Dechyoo Njik with Charlie Peter Charlie, Steven Frost and Charlie Thomas. This method is recognized to be very efficient in trigging latent memories about specific locations and their use (McFadyen 1995; Nagy 1994).

In order to supplement and test oral tradition data, to place Gwitchin culture in context and to help interpret the material recovered during the archaeological investigation, a week during the 1998 field season was dedicated to the review of historical documents at the Yukon Archives in Whitehorse. Most of the information collected is from the earliest written evidence of encounters between Gwitchin and Europeans, such as exploration journals and reports.

A last source of information that is used to supplement the data and enhance the reliability of the analogies about the traditional activities of the Vuntut Gwitchin is the ethnographic literature. Among the most relevant ethnographic works on the Vuntut Gwitchin figure those of Cornelius Osgood (1970), Douglas Leechman (1954) and Asen Balikci (1963).

Scope of Report

Chapter two sets the context of the study by providing a description of the Old Crow Flats environment and a brief ethnographic sketch of the subsistence strategy and land use patterns of the Vuntut Gwitchin. Chapter three describes the Dechyoo Njik site and its setting, as well as the excavation strategy and procedures. Chapters four and five respectively, are dedicated to the description, analysis and interpretation of the lithic and bone and antler industries. In chapter six, birch bark, wood artifacts and artifacts from the Historic Period are treated. Chapter seven presents the analysis of the faunal remains collected at the site. Finally, a summary of the results, comparisons with other sites of the study area and a concluding statement are provided in Chapter eight.

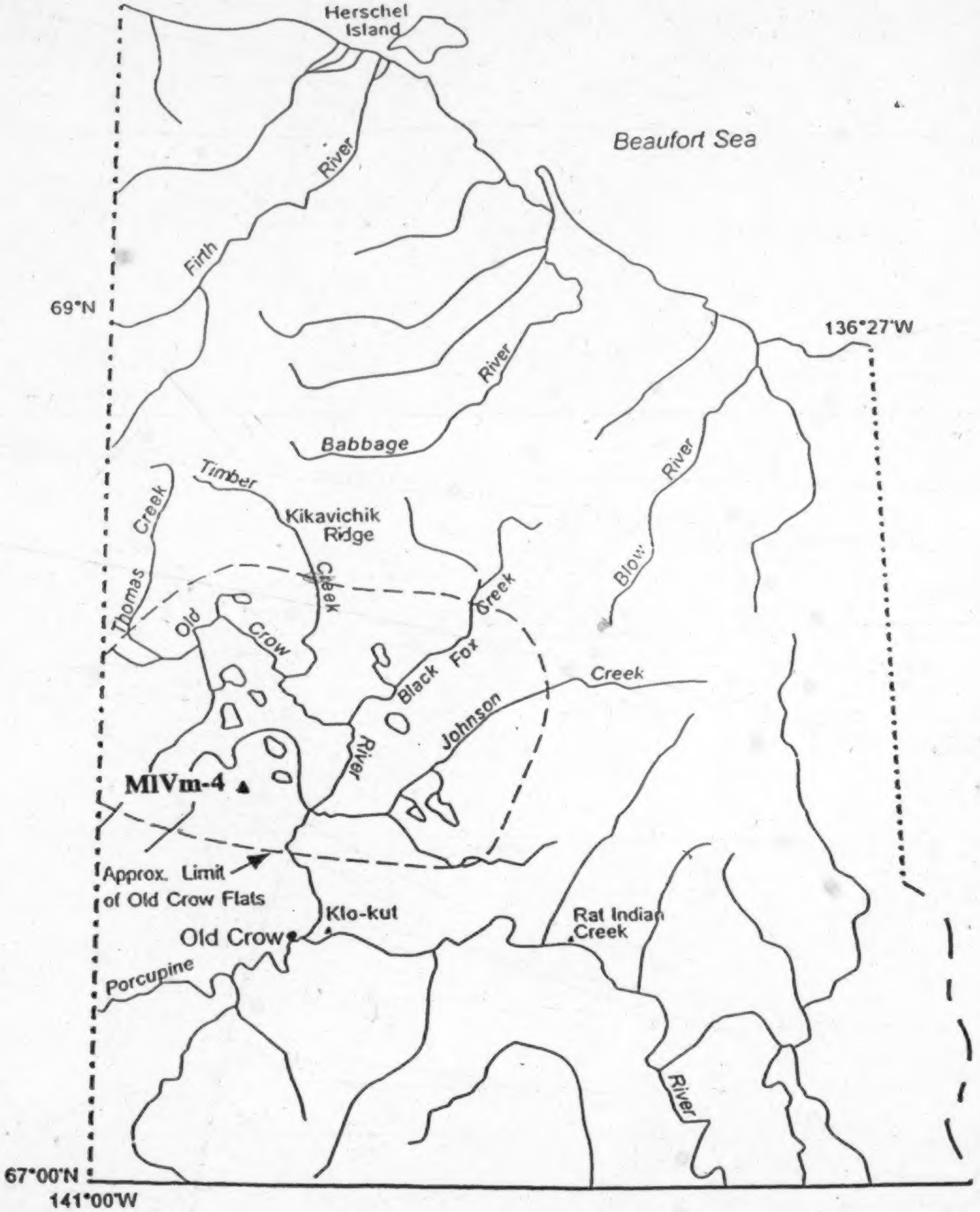

Herschel Island
Beaufort Sea
Firth River
69°N
136°27'W
Babbage River
Timber Creek
Kikavichik Ridge
Thomas Creek
Old Crow River
Black Fox Creek
Blow River
Johnson Creek
MIVm-4
Approx. Limit of Old Crow Flats
Klo-kut
Old Crow
Porcupine
Rat Indian Creek
River
67°00'N
141°00'W

Figure 1. Map of the Middle Porcupine Area Showing the Location of the Archaeological Sites with a Klo-kut Component

CHAPTER 2

The Environmental and Cultural Context

Introduction

In order to place the study in context, this chapter briefly describes the environmental variables of the northern Yukon, as well as the traditional subsistence strategy and settlement patterns of the Vuntut Gwitchin.

Part I: Environmental Context

Geology and Physiography

The Old Crow basin is locally known as the Old Crow Flats (Bryan 1957: 5). This area, which is about 8 300 square kilometers (Jopling, Irving and Beebe 1981: 7) , is located north of the Porcupine River and lies on both sides of the Old Crow River. It encompasses the region located between 67°50' to 68°20' N and 139° to 141° W (ibid.: 5). The Flats is a lowland with elevations averaging about 300 m (Wahl et al. 1987: 40; Oswald and Senyk 1977: 70).

The Old Crow Basin was part of the unglaciated area of Beringia during the Late Wisconsin glaciation (Lemmen et al. 1994; Hughes 1972: 6). It was a glacial lake that subsequently drained, from about 21 000 until 13 000 B.P. (Lemmen et al. 1994). The area is underlain by sedimentary rocks covered by a thick layer of unconsolidated deposits of sand, silts, gravels and peat (Oswald and Senyk 1977: 70; Hughes 1972: 6). Along the Old Crow River those deposits are over 45 meters in depth (Hughes 1972: 6). The region lies within the zone of continuous permafrost. It is covered with more than 2 000 shallow lakes and ponds of thermokarstic origin; these are square to rectangular in shape, with their long axis oriented from the northwest to the southeast (ibid.: 70). Most of the Old Crow Flats is drained into the Old Crow River, although the southwestern portion is drained by the Porcupine River (Oswald and Senyk 1977: 70).

Climate

The climate in the Northern Yukon Territory is characterized by long and cold winters and short summers. In the Porcupine-Peel Basin (which includes the Old Crow Flats area), winters are longer than in any other region of the Yukon Territory, lasting from mid-October to well into May (Wahl et al. 1987: 40). Summers are short with variable temperatures; some days can be very warm and then, Arctic air may suddenly transform the normal conditions into very cool and windy weather (ibid.: 37). The annual average temperature in Old Crow (lat. 67°N) is about -10°C (Wahl et al. 1987: 40; Oswald and Senyk 1977: 70). The mean temperature is 14°C in July and -36°C in January (ibid.: 15). The Ogilvie Mountains constitute a natural obstacle to moisture from the Pacific; consequently, the rate of precipitation in the area is low, with an average of 212 mm per year, of which 108.2 mm is rainfall and 103.8 mm is snow. Winds are generally calm in this area (Wahl et al. 1987: 40).

Vegetation

The Old Crow Basin is characterized by an Alpine Forest-Tundra vegetation (Rowe 1972: 63). According to Rowe (1972: 63): "Between the Mackenzie lowlands and the mountains along the Yukon-Mackenzie boundary, and on the interior Porcupine Plain of northern Yukon, an altitudinal transition takes place from forest to alpine tundra...". The elevation of Old Crow Flats is below 450 m and the region is part of the Alpine Forest ecosystem (Oswald and Senyk 1977: 71). Mostly black and sometimes white spruce are present in this environment. Paper birch, tamarack, balsam poplar, and trembling aspen are also found in specific locations, although the later three are rare (Rowe 1972: 63). Shrub birch, willow and in somes cases alder grow in openings and under trees; sedge and cottongrass tussucks are also part of the vegetation (Oswald and Senyk 1977: 71).

Other summer plants that were present on the Old Crow Flats and exploited by the Gwitchin include blueberries, salmonberries, low-bush cranberries, wild strawberries and raspberries (Osgood 1970: 28). Osgood (1970: 28) also mentions a parsnip-like tuber that was collected in August or during the winter time, as well as mushrooms, wild rhubard and rose bud tea . However, it is unknown whether or not all of these plants were available on the Flats.

Fauna

Le Blanc (Le Blanc 1984: 7-15) and Morlan (1973: 33-56) both provided a complete account of the mammal, bird and fish species that are found in the Northern Yukon and in the Middle Porcupine area. In this section, only the species that are of ethnographic importance are mentioned, with a particular emphasis upon the animals that are present in the lacustrine area of the Old Crow Flats.

Mammals

Among the mammalian species that are of ethnographic importance are caribou (*Rangifer tarandus groenlandicus)*, moose *(Alces alces)*, muskox *(Ovibos moschatus moschatus)*, mountain sheep *(Ovis nivicola)*, black bear *(Ursus americanus americanus)*, grizzly bear *(Ursus arctos horribilis)*, beaver *(Castor canadensis)*, muskrat *(Ondatra zibethicus spatulatus)*, arctic ground squirrel *(Spermophilus parryii parryii)*, and hare *(Lepus americanus dalli)* (Le Blanc 1984: 7-8). Other mammals that were hunted only in time of starvation include four species of fox *(Vulpes)*, otter *(Lontra canadensis pacifica)*, mink *(Mustela vison ingens)*, marten *(Martes americana actuosa)*, ermine *(Mustela erminea)* and wolverine *(Gulo gulo)* (Osgood 1970: 24). Of all these species, only caribou, moose, muskrat, beaver, wolverine, mink, marten, black bear, and ermine are found on the Old Crow Flats.

A comprehensive description of the Porcupine Caribou herd distribution is included in Le Blanc (1984: 6-20) and Morlan (1973: 36-41). According to Skoog (1968), the size of the Porcupine herd undergoes significant fluctuations over time. In 1971, the total population of the herd was estimated to 60 000 animals (Jakimchuk et al.: 1974: 19), while in 1999, the herd is composed of 160 000 caribou (Vuntut Gwitch'in 1996). The annual movements of the herd are variable and cannot be always predicted (ibid.). Generally, the caribou wintering grounds are located south of the Porcupine River and in the Chandalar drainage of northeastern Alaska (Le Blanc 1984: 19). Wintering occurs from early October to well into March. Starting from mid-March to mid-May, the spring migration follows either the Old Crow route, which passes through the the Old Crow Flats area, or the Richardson Moutains route (Jakimchuk et al. 1974: 20-21). Sometime between late May and early July, the caribou reside on their calving grounds located on the plains of the Arctic Coast and on the foothills of the north slope (Le Blanc 1984: 19). In early July, the herd gathers in northeastern Alaska for a few days before heading back to the Yukon. There, the animals concentrate for a week on the headwaters area of Johnson Creek and Driftwood River (ibid.: 19), before migrating back to Alaska, via the same routes they use during the spring migration (Jakimchuk et al. 1974). Thus, although small herd segments may also occasionally winter in the Old Crow Flats, caribou is usually not available in the area except from during the two annual migration periods (ibid.).

Apparently, moose are not very abundant in the Old Crow area (Jakimchuk 1971: 142; Balikci 1963: 7). However, this situation may be changing, since during the 1997 and 1998 field seasons, many of them were observed while flying in helicopter over the area. During both the 1983 and 1997 excavations at Dechyoo Njik a moose walked straight through the site. One of them was also seen at another camp on the Old Crow Flats during the summer 1998. Thus, there are probably fluctuations in moose populations over time.

The Old Crow Flats is the richest muskrat location in Canada (Balikci 1963: 9) and thousands of them inhabit the numerous swamps and lakes of the area (Leechman 1954: 1). In this particular environment, muskrats either live in simple burrows dug in the banks of the streams or in "push-ups", which are houses similar to beaver lodges constructed on and around shallow lakes (Balikci 1963: 9, Mason 1924: 130).

Traditionally beavers were numerous in the marshy area of the Old Crow Flats, as well as and around the middle and lower Porcupine River (Balikci 1963: 11). However, due to their sedentary behavior, they became a very easy prey when the steel trap and the gun were introduced into the country. As a consequence, the beaver population is now very low on the Old Crow Flats (ibid.).

In historic times, some wolverine and mink were trapped on the Old Crow Flats, thus suggesting that they were relatively abundant in the area (Bryan 1957: 7). Marten, however, although present, were not abundant. Finally, no precise data are available concerning the density of black bear and ermine in the Old Crow Flats area.

Birds

One hundred seven bird species have been identified in the Old Crow area (Irving 1960: 155). Although not all of those were eaten by the Vuntut Gwitchin, many species complemented their diet. Most of them are migratory waterfowl: they include ducks, of which 14 species have been recorded (ibid.: 167); geese; swan; teal; mallard; white-winged scoter; widgeon (those are all from the *Anatidae* family); and loon *(Gavidae)* (Osgood 1970: 28). In addition, four birds that are permanent residents in the area were also hunted. These are the spruce and the ruffed grouse *(Canachites canadensis osgoodi, Bonasa umbellus)* and the willow and the rock ptarmigan *(Lagopus lagopus alascensis, Lagopus mutus nelsoni)* (ibid.). Osgood (1970: 28) also mentions that gulls *(Laridae)*, owls *(Strigidae)* and hawks *(Accipitridae)* were occasionally taken and that in time of starvation, whiskey-jacks *(Perisoreus canadensis pacificus)* were eaten. Apparently, eagles *(Aquila chrysaetos canadensis, Haliaeetus leucocephalus alascanus)*, common ravens *(Corvus corax principalis)* as well as woodpeckers *(Picidae)* were never taken. Unfortunately, no explanation was provided by Osgood (1970: 28) concerning the avoidance of those specific birds.

Waterfowl are particularly plentiful in the Old Crow Flats. In fact, the area represents the most important breeding ground in the whole Yukon Territory, with an average waterfowl density of 87 birds per square mile (W.E. Stevens, pers. comm., cited in Balikci 1963: 13). Although not all the species nest on the Old Crow Flats, many stay in the area for the whole summer. Grouse and ptarmigan are also available on the Old Crow Flats (Irving 1960). As for the other species, their distribution is not precisely known, but it is probable that most of them are inhabitants of the Old Crow Flats, since the area is a favorable environment for birds.

Fish

Numerous species of fish were harvested by the Vuntut Gwitchin. Three species of salmon pass by the Porcupine and Crow Rivers from July through October: chinook (king) *(Salvelinus Tshawytscha)*, coho (dog)*(Oncorhynchus kisutch)* and humpback (silver) *(Oncorhynchus gorbuscha)* (Osgood 1970:33). Other *salmonidae* present in the area include lake trout *(Salvelinus namaycush)* and arctic char *(salvelinus alpinus)*. Various species of whitefish *(Coregonidae)* were also of great importance. Among those figure the broad whitefish *(Coregonus nasus),* the humpback whitefish *(Coregonus clupeaformis),* the round whitefish *(Proscopium cylindraceum),* the least cisco *(Coregonus sardinella),* the arctic cisco *(Coregonus autumnalis),* and the inconnu *(Stenodus leucichthys nelma)* . In addition, the Vuntut Gwitchin also fished for longnose suckers *(Catostomus catostomus)* , burbot *(Lota lota),* arctic grayling *(Thymallus articus)* and northern pike *(Exos lucius)* (Peter Tizya: 04/08/1998; Osgood 1970: 33) .

Of all the species mentioned above, whitefish, grayling, loche, sucker and northern pike are known to be very abundant in many rivers, lakes and creeks (Balikci 1963: 12-13) and are consequently available in the Old Crow Flats. These fish usually migrate in the spring, leaving the rivers to reach their spawning grounds located in smaller tributaries (Steingenberger et al. 1974). The spring migration apparently takes place in all rivers. The movement is usually upstream, however, for most species, the exact location of the migrations is unknown (ibid.). In the fall, fish return to the rivers for the winter, although whitefish, northern pike and other species sometimes stay in large lakes located in the Old Crow Flats (Steingenberger 1974: 11). Some of the streams in the Porcupine River drainage do not contain fish in the winter time (from October to May), because they are frozen from top to bottom. This is the case for many streams in the Old Crow Flats, including Potato Creek, Surprise Creek, Schaeffer Creek and Rat Indian Creek (Steingenberger et al. 1974: 9).

Part II: Cultural Context

Introduction

The Old Crow Flats area was traditionally occupied by the Vuntut Gwitchin, whose territory is mostly composed of the area located north of the headwaters of the Porcupine River (Petitot 1970: 27; Murray 1910: 83; Dall 1890: 430). The region that lies directly south of the Porcupine River was also part of their country (Osgood 1970: 14). Murray estimated that the band included 80 men (1910: 35, 83), thus suggesting that with women and children, the total Vuntut Gwitchin population could be estimated to between 200 and 400 members (Graburn and Strong 1973: 75).

The Vuntut Gwitchin relied mainly on caribou for their subsistence; fish was of secondary importance in their diet. Muskrat meat was also sufficiently important for the Vuntut Gwitchin to warrant their being referred to as muskrat eaters (Osgood 1970: 31). In addition, a vast array of other resources complemented their diet. In order to acquire the animals and plants they subsisted on, the Vuntut Gwitchin had to move within their territory, according to the availability of these resources. However, little information is available concerning their settlement and land use patterns. Consequently, the following is an average description of their typical annual cycle and subsistence strategy, based upon fragments of information gathered from various sources, including early historical accounts, ethnographic works, oral history and archaeological data.

The Annual Cycle and Subsistence Strategy of the Vuntut Gwitchin

In the spring time, the Vuntut Gwitchin asembled on the Porcupine River to intercept the northern migration of the barren-ground caribou at traditional crossing locations. Morlan (1973: 85) reports that major camps and lookouts were located between the mouths of the Bell and the Colleen rivers. Both late prehistoric and historic caribou hunting camps were found in this area (ibid.). At those locations, people probably took advantage of the fact that caribou are more vulnerable when in the water, and killed them while they were crossing the river. Leechman (1954: 6) describes this hunting method as follows:

> When the caribou entered the water, men would paddle a canoe right up on the animal's back and let it rest there. At first the caribou would strike out with its forfeit to rid itself of the canoe but would then content itself with merely swimming faster. Through fear, the herd of caribou would spread a little, making a path for the one bearing the canoe, and the man armed with a spear with a caribou-antler point would stab the animals on each side of him.

In the late spring, people moved to the Old Crow Flats area where they hunted muskrat, shot migratory waterfowl and fished. Most summer camps were located on tributaries of the Porcupine and Old Crow rivers (Morlan 1973: 86). If the season was good, people could live in larger groups during that period (Big Joe Kay, cited in Balikci 1963: 29).

Muskrat were hunted at night (Charlie Peter Charlie: 10/07/1998) with hoop nets; they were also shot with blunt arrow heads (ibid.: 10/07/1998; Balikci 1963: 18). When eaten, the animals were singed upon the fire before being butchered and boiled or roasted (Morice 1910: 158). Elder Mary Kassi (02/08/1998) also mentioned that sometimes the meat was preserved by drying and smoking, and then boiled just before being eaten. After the price of muskrat skins began to rise in 1917, muskrats started to be more systematically hunted (Balikci 1963: 41). Traps were set in the muskrat houses or placed in front of the rat holes and the animals were also shot with .22 calibre rifles (Mary Kassi: 02/08/1998; Balikci 1963: 41-42). A steady trapper could get over a thousand muskrat during the season, which lasted from March through mid-June (Balikci 1963: 42).

Duck were hunted from birch bark canoes (Big Joe Kay, cited in Balikci 1963: 29) with bow and arrow (Osgood 1970: 83; Balikci 1963: 18). The arrows used for killing them were described as follows (Osgood 1970: 83):

> The double-pointed arrow have two round bone points about six inches long and three-eights of an inch in diameter. The points are supposedly sharp at the end but actually rather blunt and are not barbed. They are slightly spread at the ends but almost parallel. They are bound into grooves at the side of the tip of the shaft and serve principally to shoot ducks.

Various techniques were employed for fishing. The most efficient, however, was the fish trap; such a device was used to capture fish in the rivers and on smaller tributaries, where it was usually constructed at the confluence of two streams. The building and the management of a fish trap were communal activities that involved many families (Balikci 1963: 18). Two different types of traps were built by the Vuntut Gwitchin: one was used when the fish was going upstream, and the other served to catch fish in late summer, when moving downstream (Charlie Thomas: 30/07//998; Charlie Peter Charlie, Charlie Thomas and Steven Frost: 10/07/1997; Osgood 1970: 33, 73). The first type, according to Osgood (1970: 73), was used to capture the salmon going upstream, although it is likely that is was also used to catch other fish species:

> A V-shaped weir is built extending entirely across a slough with the point directed upstream. The fish come up against the barrier and not being able to pass, follow it from one side to the other, eventually entering the willow pole trap which is positioned below one end with a double directing fence leading to the entrance ...

Although none of the elders interviewed during the summer of 1998 ever used this model of trap, they were aware of its existence (Charlie Peter Charlie, Steven Frost and Charlie Thomas: 10/07/1998). The second type of trap, named sluice-trap by Osgood (1970: 74), was described as follows:

> It is made in the late summer for a couple of months' use to catch jackfish, grayling, suckers, and other fish. It is placed in a side stream where the water is only two to four feet deep. The weir is built V-shaped from one bank to the other, pointing upstream, and with an opening at the point leading into the sluice. To make this weir, stakes are driven into the river bed two or more feet apart with stones held in the hands. Between the stakes peeled willow poles are woven about an inch apart and tied with peeled and split spruce roots, making a sort of wicker work... The sluice part of the trap is about four feet wide and fifteen feet long, constructed from stakes and tied interwoven willow poles in the same fashion as the weir. When the fish enter the sluice in sufficient quantity, a man closes the entrance with a dipnet and

> the fish are driven with sticks to enter either the dipnet or the basket at the other end. Those which enter the dipnet are pulled out in it and the entrance to the basket is closed with a fish scoop... This basket which the fishermen fasten at the end of the sluice is made rather U-shaped out of willow poles of varying diameters and from eight to ten feet long. At the closed end of the fish basket which rises to the surface of the water, a platform is built on which one man stands while hitting the cornered fish over the head with a club. The fish when killed are strung on a willow withe and laid on the platform. The platform itself is built on an X-shaped construction of poles and may be fifteen feet long and ten feet wide. The surface is covered with moss over which is spread grass on which to pile the fish.

The information about Vuntut Gwitchin fish traps collected by Balikci (1963:18) in the village of Old Crow corresponds to Osgood's detailing of the sluice-trap; the Elders' descriptions from 1998 are also very similar (Peter Tizya: 04/08/1998; Charlie Thomas: 30/07/1998). A drawing of the device based on the description of Elder Charlie Thomas was made by Laurence Charlie, a Gwitchin artist from Old Crow (Figure 2). The drawing matches Osgood's description of the fish trap in most respects. A noticeable difference, however, is that according to Mr. Thomas, the top of the basket trap was opened. Charlie Thomas (30/07/1998) also stated that the basket trap was peeled off so that people could see the fish in the trap at night. Since fish do not run during the day, fishing was a night time activity (Mary Kassi: 02/08/1998; Charlie Thomas: 30/07/1998; Charlie Peter Charlie and Steven Frost: 10/07/1998).

A considerable amount of fish could be taken with the fish trap and a lot of fish was processed during the summer for winter provisions (Charlie Peter Charlie: 10/07/1997, Murray 1910: 89, Dall 1890: 201). According to Balikci's information (1963: 18), when people from Old Crow used to build fish traps on the Old Crow River, up to 2000 fish could be taken in one night . A fish trap was also briefly run in 1957 or 1958 on Lord Creek; thousands of fish were captured every night (Steingenberger et al. 1975: V-14). Apparently, fish traps stopped being operated in the 1940s on the request of the RCMP (ibid.). The reason for this was that these fishing devices were too efficient (Peter Tizya: 04/08/1998).

Other fishing implements were also used by the Vuntut Gwitchin. Two of them are associated with the operation of the fish trap. The first one is the fish scoop described by Osgood (1970: 69):

> It looks like an exaggerated tennis racquet about five feet long made from willows which are bent racquet-shape at the end and cross-meshed with willow rods. This instrument the fishermen use to push, or drive into, or along the trap, fish which hesitate. The instrument does not serve to take the fish out of the traps. The Indians do this with their hands after first driving the fish to the shallow upper end of the baskets and hitting them over the head with a club.

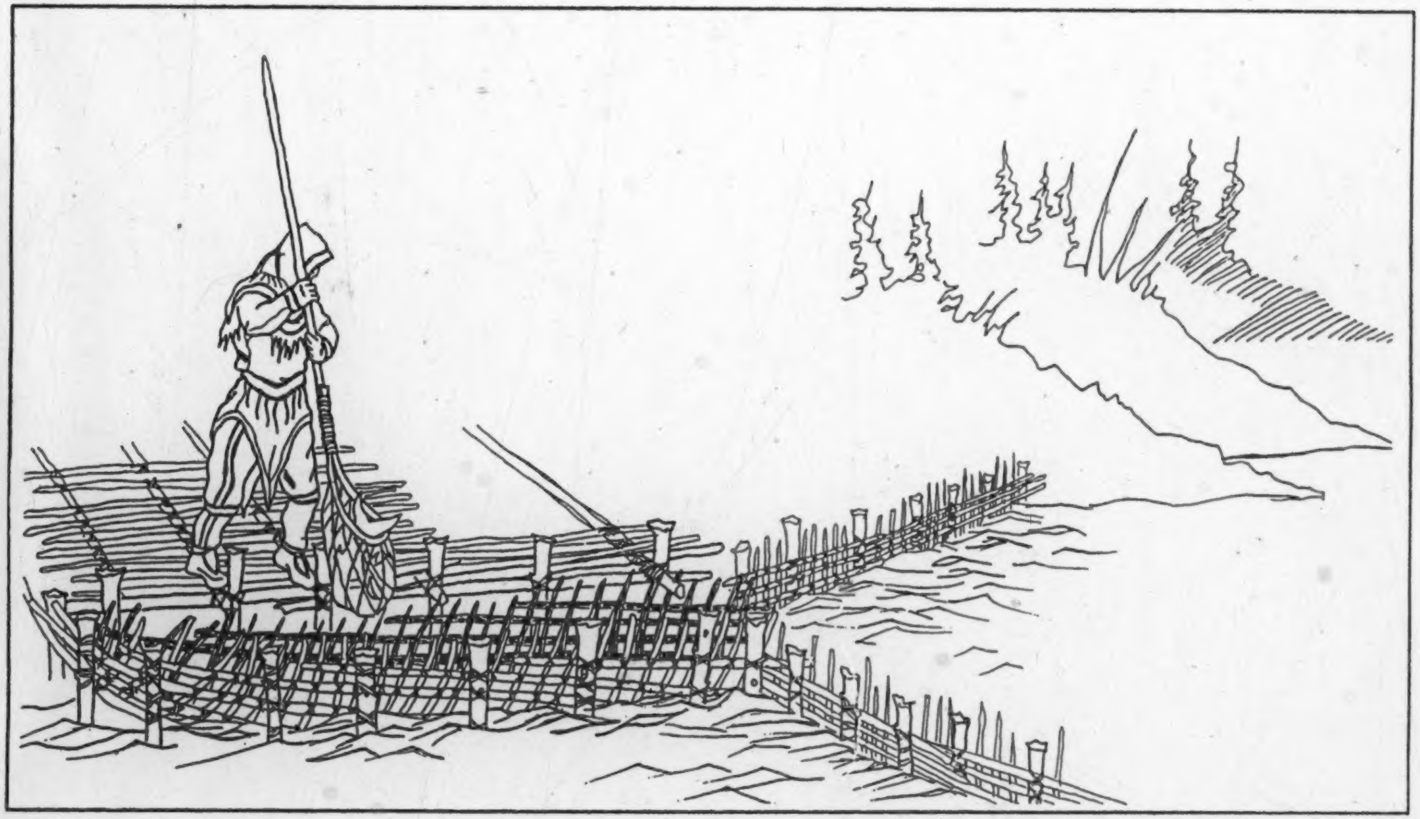


Figure 2. Drawing of a Downstream Fish Trap by Laurence Charlie

None of the elders interviewed mentioned the fish scoop. The dipnet, however, which was used to remove fish from the trap and also as an independent fishing implement, was well known. The loop end of a dipnet measures between one to three feet in diameter while the handle is about four to six feet long (Osgood 1970: 74). The net was made from twine, willow bark (ibid.: 70) or babiche (Mary Kassi: 02/08/1998). Bone fish hooks were also used as fishing implements (Mary Kassi: 02/08/1998; Charlie Peter Charlie: 10/07/1998; Osgood 1970: 74). Osgood (1970: 74) mentions that they were made from caribou metacarpal, while the barb was cut into a piece of caribou antler and tied up to the other section with sinew. The bait used with the hook was an entire small fish (ibid.). The three-pointed leister spear as well as the toggle-head spears were also employed by the Vuntut Gwitchin (Osgood 1970: 73). It is uncertain whether or not gill nets were used. According to Murray (1910: 89), Gwitchin Natives did not know about this technology. However, Vuntut Gwitchin informants maintain that gill nets were manufactured from willow bark (Charlie Peter Charlie: 10/07/1998; Osgood 1970: 72; Leechman 1954: 18). The process is described by Leechman (1954: 18):

> The preparation of this cordage was a tedious process, and much of the work had to be done with the hands under water to keep the fibre moist and flexible. The bark was best when gathered in summer. The threads were rolled on the naked thigh, and experts could make them quite long. If gathered too late in the season, the fibre was brittle. A net would easily last a year and sometimes more.

According to Osgood (1970: 72), the Vuntut Gwitchin also produced fishing nets from thin caribou babiche.

Fish was used in different ways. When eaten fresh, it was either split and broiled on willow twigs, laid close to the fire and broiled, or cut in pieces and boiled in a container with hot stones (Osgood 1970: 29). Fish grease was made by simmering the guts with water in a kettle over the fire (Leechman 1954: 9). According to Osgood (1970: 30), all fish eggs were dried. When large quantities of fish were taken, they were prepared by women and dried on racks. They were placed in caches and kept for later use (Balikci 1963: 84; Hodges 1919: 883). Before being eaten, the smoked fish was boiled (Peter Tizya: 04/08/1998; Mary Kassi: 02/08/1998). When the weather was cold, the fish was hung to freeze (Steingenberger et al. 1975: V-23). Fish that was used to feed dogs underwent minimal preparation and was just hung in bundles (Charlie Peter Charlie: 10/07/1998).

In addition to duck hunting and fishing, the summer season was also dedicated to the gathering of various species of berries (Leechman 1954: 6; Hodges 1910: 883). Not only did they add to the daily diet, but some of them were also preserved for winter use (Osgood 1970: 28; Mason 1924: 45). Berries were gathered in birch bark containers (Steven Frost: 10/07/1998).

During the late summer and fall, the Vuntut Gwitchin spent their time hunting caribou on the moutain slopes located north of the Old Crow Flats area (Charlie Peter Charlie: 10/07/1998; Big Joe Kay, cited in Balikci 1963: 29; Hodges 1910: 882-883). Here, they built surrounds of considerable size. The constructions of the Peel River Gwitchin were described by Osgood (1970: 25):

> Posts about four feet high are set up in the ground to form an enclosure roughly circular in form. Between these posts, poles and brush prevent the caribou from escaping except through narrow openings about eight feet apart in which snares are set. One side of the surround is open and from this entrance stretch out two lines of posts ever widening like the mouth of a funnel. This projecting line of posts is not a fence, strictly speaking, but a series of poles set up six feet high and hung with moss to represent men so that caribou which have entered the trap will be afraid to run in any other direction except that which leads to the snare-set enclosure. Some of these surrounds are so large that the inner part is a mile and a half in diameter.

Balikci (1963: 15-16), provides a description an historic surround built by the Vuntut Gwitchin south of Firth River and explains how the hunt was carried on:

> The opening of the surround was about 30 yards wide. The corral had an oval shape, was very large, and was covered with hundreds of snares made of caribou skin *babiche*. Such a surround, called *Hintlit-thelrit*, was built with poles obtained usually from the timbered valley nearby. Each surround was owned by a single individual, an elderly and experienced hunter, who was not necessarily the tribal chief... The people were scattered in small groups along the hills, each (separate) group attending to a surround under the leadership of the surround owner and organizer of the hunt. As soon as the herd approached, boys, men and women tried to run behind the caribou, imitating the cry of the wolf, and attempting to drive the herd towards the opening of the surround. Just beside the opening a few men armed with bows and spears lay in ambush, trying to wound some caribou as they passed the entrance. Once the herd as in the surround, spear hunters went in action... Most of the caribou, however, were caught either in the external ring of snares, or in the snares placed inside the corral.

Other methods of hunting caribou included the independent use of snares, spears, and the bow and arrow (ibid.: 26). A great quantity of meat was accumulated and cached during the fall (Hodges 1910: 883). The meat was usually cooked by boiling or roasting; when it was not used for immediate consumption it was dried (Osgood 1970: 30). Bone grease was obtained by simmering smashed caribou bones in water (Leechman 1954: 9). In addition, skins for the production of clothes, shelters and lines were obtained and bone and antler for the production of various implements secured.

After freeze-up, the Vuntut Gwitchin migrated south of the Porcupine River and spent the winter in this forested area (Big Joe Kay, cited in Balikci 1963: 29). Since food was usually scarcer at that time of the year, groups split into smaller bands and were constantly on the move (Charlie Peter Charlie: 10/07/1998). Caribou, which usually wintered in this area, were hunted with bows and arrows (Big Joe Kay, cited in Balikci 1963: 29), but the people would live on any resources they could secure (Charlie Peter Charlie: 10/07/1998).

Conclusion

In conclusion, it is important to keep in mind that although it is likely that the annual cycle and subsistence strategy of the Vuntut Gwitchin generally followed a regular pattern, it was in no way static. No doubt many environmental factors, such as exceptional weather conditions, forest fires, irregular caribou migration patterns and animal life cycles forced people to adapt and modify their land use patterns from time to time. Cultural variables could also be responsible for variability in the subsistence and settlement patterns.

CHAPTER 3

The Physical Context of the Dechyoo Njik Site

General Description

The Dechyoo Njik site is located in the southwestern portion of the Old Crow Flats, about 40 km north of the Porcupine river (67°58' N; 140°15' W). This area is covered by a multitude of lakes and swamps. The site is situated on a point bar on the left bank of Schaeffer Creek. This location is the meeting point of Schaeffer Creek with the mouth of a smaller creek known by Old Crow people as Dechyoo Njik (translated as goose with red bill and feet *(Dechyoo)* creek *(Njik)* (Plate 1).

The site consists of a small grassy clearing about 20 m by 15 m. It is delimited to the north and the east by Schaeffer Creek and to the south by Dechyoo Njik. Dechyoo Njik enters Schaeffer Creek southeast of the site and the latter flows towards the east . At the confluence of the two creeks, Schaeffer is about eight meters wide and two meters deep while Dechyoo njik is about five meters wide and from one to one and a half meter deep. The former has muddy water, while the latter is a clear water stream rising in the mountains. On the west side, the site is bounded by a narrow belt of open spruce forest which rapidly tranforms into tussock tundra.

The site was first briefly tested in 1983, by a survey crew consisting of J. Cinq-Mars, R. Le Blanc and C. Peter Charlie. A second testing operation was carried out in 1985 by Dr. R. Le Blanc and his crew. Overall, about 16 one-meter square units were excavated during these two years. The tests revealed the presence of several hearth features and a great quantity of faunal material, a large proportion of which were fish bones. Waterfowl, large mammal and muskrat remains were also identified. The position of two possible structures was recorded in 1985, to the east and west margins of the site. Although limited, the artifact collection suggested a cultural affiliation with the Klo-kut Phase (A.D. 700 to the contact period), defined on the basis of work at the Rat Indian Creek site (Le Blanc 1984), and integrating earlier work at Klo-kut (Morlan 1973).

Excavation Strategy

The 1997 excavation was conducted over a period of 21 days. The crew was composed of six members, including Dr. Raymond Le Blanc, John Butt, Julie Esdale and Mélanie Fafard from the University of Alberta, and Vernon Kaye as well as Tracy Capowski, two young Gwitchin from Old Crow.

Plate 1. The Dechyoo Njik Site (MlVm-4)

Since the exact location of the 00 datum set for the 1985 excavation could not be relocated in 1997, a new datum was established in the southwest corner of the clearing. An arbitrary north was used for the orientation of the grid. An east-west baseline was extended with a transit along the southern margin of the clearing, and another south-north line was set along the western limit of the site. One-meter by one-meter units were then placed along those lines, on the north and the east portions of the site.

Overall, 41 units were excavated in 1997 (Figure 3). Excavation was conducted entirely by trowel. The location of each artifact was recorded in three dimensions. Vertical recording was performed using line levels and an arbitrary datum point located in the centre of the excavated area. Since faunal remains and fire-cracked rock were so numerous, they were recorded and bagged by level of excavation unit. It was impossible to sieve all the sediment excavated at the site. The sediment was damp and the clay component caused it to clump, thus preventing it from passing through the 3 mm mesh. Water washing was attempted, but the pressure device failed early on in the project. Short of sieving the material in the creek, which was not really feasible, we decided to sample the units. More sediment was sifted when it was considered necessary as, for example, when seed beads or small bone fragments were encountered. Several samples of wood, charcoal, fish scales and sediment were collected.

Stratigraphy

The point bar on which the site is located was gradually built by repeated overbank flooding. However, the sediment is composed of such an homogenous alluvium, that discrete flooding episodes cannot be identified in the stratigraphic profile. The environment at this location has been stable long enough to allow the development of a weak soil including three horizons (Julie Esdale, pers. comm., 1999). These were used as markers to delimit arbitrary levels. Level 1 is a black sod (10YR 2/1, black in the Munsell chart) including grass and sphagnum moss, decaying plants and other organic matter, as well as a great number of roots. Little cultural material was found in this level which is between five and ten centimeters thick. Level 2 is a greyish silty clay (5YR 3/1, very dark grey) that ranges between five and twenty centimeters in thickness and contains a lot of organic material. Most of the cultural material was found within this level. Finally, level three is the parent material, consisting of a dark grey silty clay (10YR 4/1). No more than a few artifacts were collected in this level. In fact, most of the silty clay is located in the permafrost zone and the active layer is no more than 30 cm thick (including the three levels). The wide range of thicknesses found in levels 1 and 2 is due to cryoturbation processes. Repetitive freeze-thaw cycles, but mostly frost cracks and frost wedges, are responsible for the deformation of the soil matrix (Plate 2).

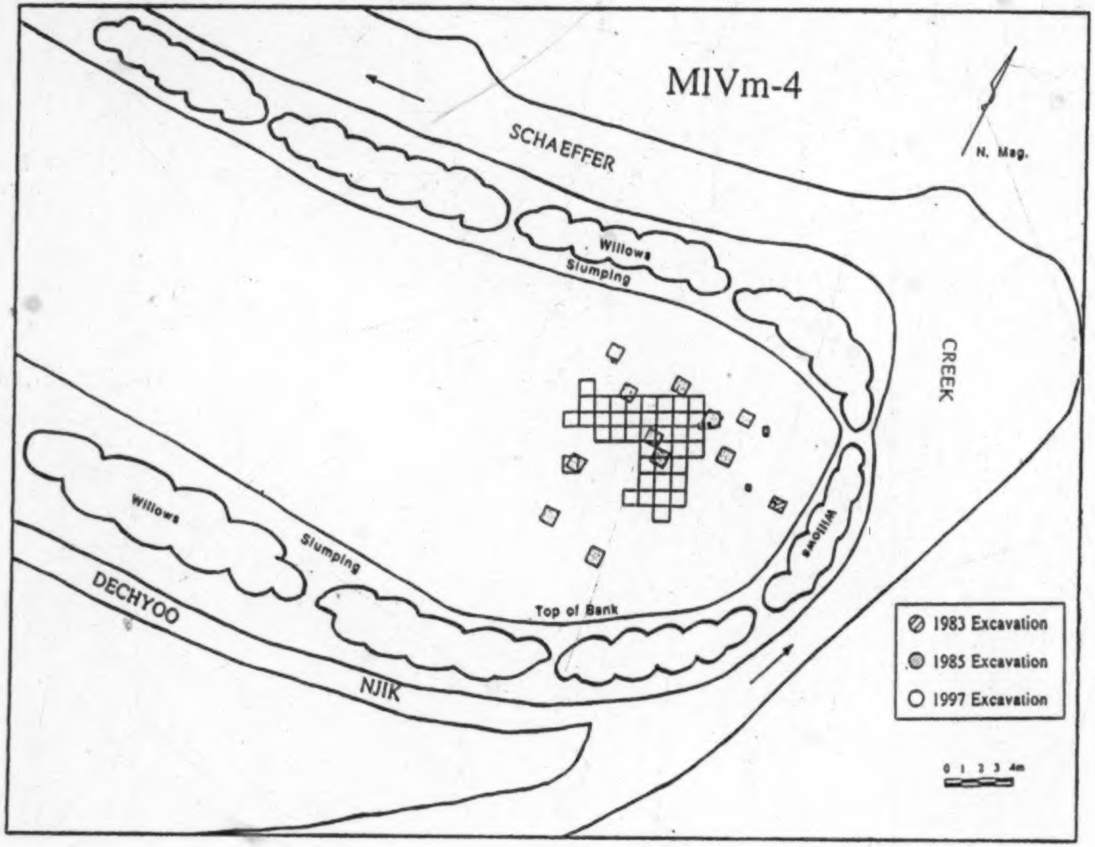

MIVm-4
N. Mag.
SCHAEFFER
CREEK
Willows
Slumping
Willows
Slumping
Top of Bank
Willows
DECHYOO
NJIK
1983 Excavation
1985 Excavation
1997 Excavation
0 1 2 3 4m

Figure 3. Map of the Dechyoo Njik Site

Plate 2. Deformation of the Soil Matrix by Frost Cracks between Earth Hummock

The fact that the environment was stable and no overbank flooding occurred after the site was first occupied resulted in the absence of a cultural stratigraphy. As previously mentioned, the great majority of cultural remains was found in level 2. It was common to find diagnostic artifacts dating from the Late Prehistoric Period adjacent to historic goods. Consequently, the stratigraphy cannot be used in order to reconstruct the chronology of the site and to distinguish between the discrete occupations.

Chronology

Based on the artifact sample from Dechyoo Njik we can recognize at least two distinct periods of occupation of the site. The first one took place during the pre-contact period and is attested by the occurrence of artifacts such as fire-cracked rock, stone tools and bark implements. In 1991, the NOGAP (Northern Oil and Gas Action Plan) archaeological project had an Accelerator Mass Spectrometry (AMS) radiocarbon date (RIDDL-541) performed on a worked piece of caribou antler collected by Le Blanc in 1985. (Cinq-Mars 1991: 149). The artifact was dated to <180 B.P., thus placing it in the Klo-kut Phase of the Late Prehistoric Period in the Northern Yukon, which extends from A.D. 700 up to the Historic period. Another radiocarbon date was performed on a charcoal sample collected in 1997, from unit N8E9; it was part of a large hearth area that covered part of three units, within Level 2. The sample was dated to 555 +/- 40 years B.P., and also falls within the Klo-kut Phase. This date, however, is much older than the date obtained from the piece of worked antler. This could be explained by the fact that people at the site collected and burnt old wood. The site could also have been repeatedly occupied for a long time during the Klo-kut Phase. In order to verify this hypothesis, however, several radiocarbon dates would have to be obtained from other charcoal samples, so that a chronological sequence of the successive occupations of the site could be reconstructed.

The second period of occupation at the site is an Historic occupation characterized in the assemblage by the presence of a variety of Euro-Canadian trade goods. The first encounter between the Gwitchin and Europeans took place in 1789, when Alexander Mackenzie was travelling near what is now Fort McPherson (Osgood 1970: 17; Leechman 1954: 5). However, the Natives encoutered by Mackenzie were not Vuntut Gwitchin and in fact, contact between them and the Europeans was not common until the 1840s, when trading posts were founded in the area. The first one to be established in the area was Fort McPherson, in 1840. La Pierre House was built in 1842 and Fort Yukon, in 1847 (ibid.). Although some Russian trade goods probably reached the Gwitchin prior to the establishment of English trading posts, the Natives' traditional way of living as well as their material culture were not really altered before the first half of the nineteenth century.

Features

Forty-three features were encountered at Dechyoo Njik during the 1985 and 1997 excavations. These include hearths, refuse pits, a cache pit and two shallow depressions that are thought to represent the position of historic structures. Distribution plans of the 1985 and 1997 features are respectively represented on Figures 4 and 5. Since the two excavations were not conducted using the same grid (see Figure 3), it was impossible to represent the features from the two archaeological operatives on a single map; consequently, Figures 4 and 5 are not comparative but additive. Table 1 contains a summary of metric and non-metric attributes for all the features of the site.

Hearths (N=35)

Hearths are the most common features at Dechyoo Njik. Several problems made the identification of individual hearth episodes difficult. First, since all the occupations at the site took place on the same level, many of these features have been disturbed and a great number of secondary ash deposits are found around the site. There are also overlapping hearths in various locations. Finally, cryoturbation and more specifically frost cracks, also deformed and displaced hearth features (Plate 3). Three categories have been created to classify hearth features. Hearths represent features that could be identified as single behavioral episodes. Hearth areas are composed of zones of various dimensions where disturbance or overlapping of features made it impossible to recognize and quantify individual hearths. Finally, ash deposits are thin lenses of ash and/or charcoal that vary in size from a few to 40 cm. Those are likely to be the result of secondary deposition.

Individual Hearths (N=6)

Only six individual hearths could be identified at the site. The average measurements for this class is 61 cm in length, 49 cm in width and 8 cm in thickness. Charcoal was found in all the features, while 67% of the hearths had fire-cracked rock in them and 83% contained bones; artifacts were present in three of the six hearths.

Hearth Areas (N=9)

Hearth areas are the largest of the features at MlVm-4. Their average dimensions are 120 x 101 cm. The mean thickness for the hearth areas is 8.4 cm which surprisingly is not much more than the average thickness of individual hearth episodes. This could be because overlapping of the hearths occurred more in a horizontal plane than in a vertical one. Charcoal was found in all hearth areas. Fire-cracked rocks were present in 88.9% of the features and bones in 88%. Finally, 66.7% of the hearth areas contained artifacts.

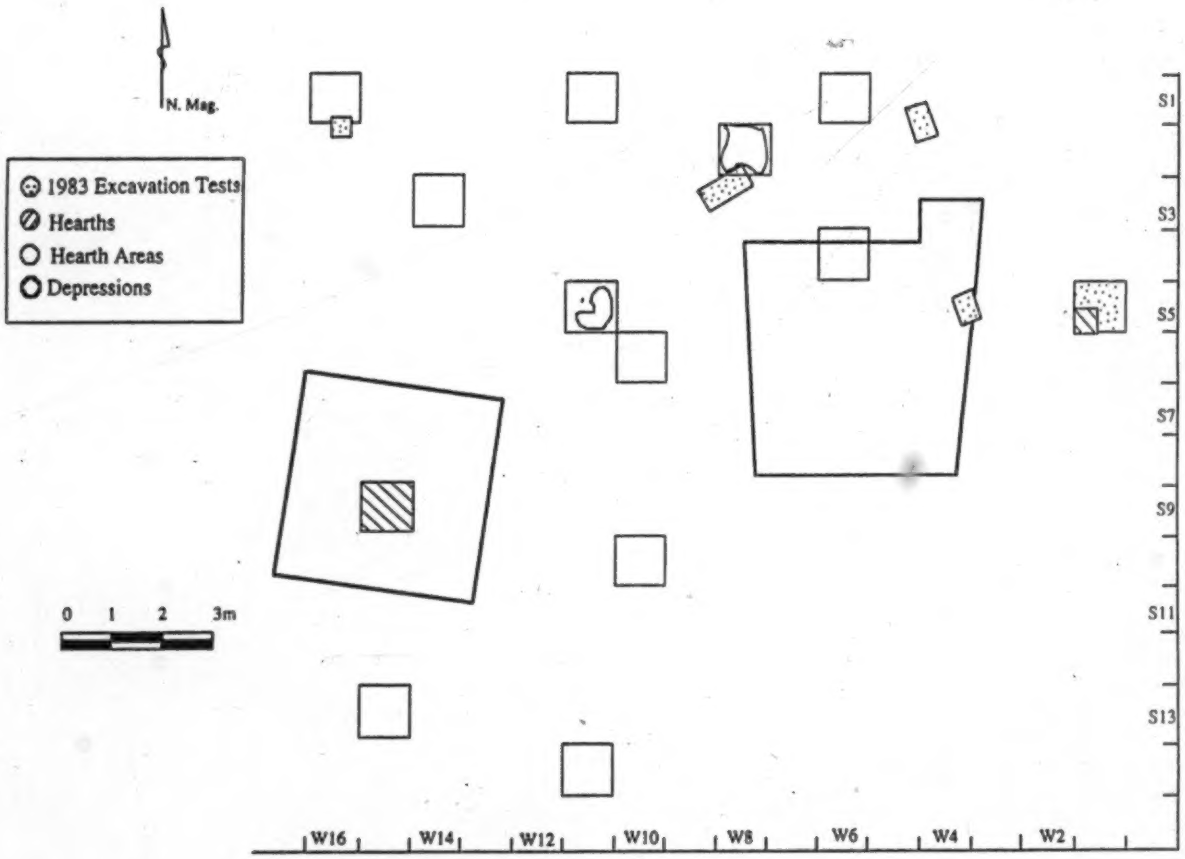

N. Mag.
1983 Excavation Tests
Hearths
Hearth Areas
Depressions
0
1
2
3m
S1
S3
S5
S7
S9
S11
S13
W16
W14
W12
W10
W8
W6
W4
W2

Figure 4. Map Representing the Features from the 1983 and 1985 Excavations

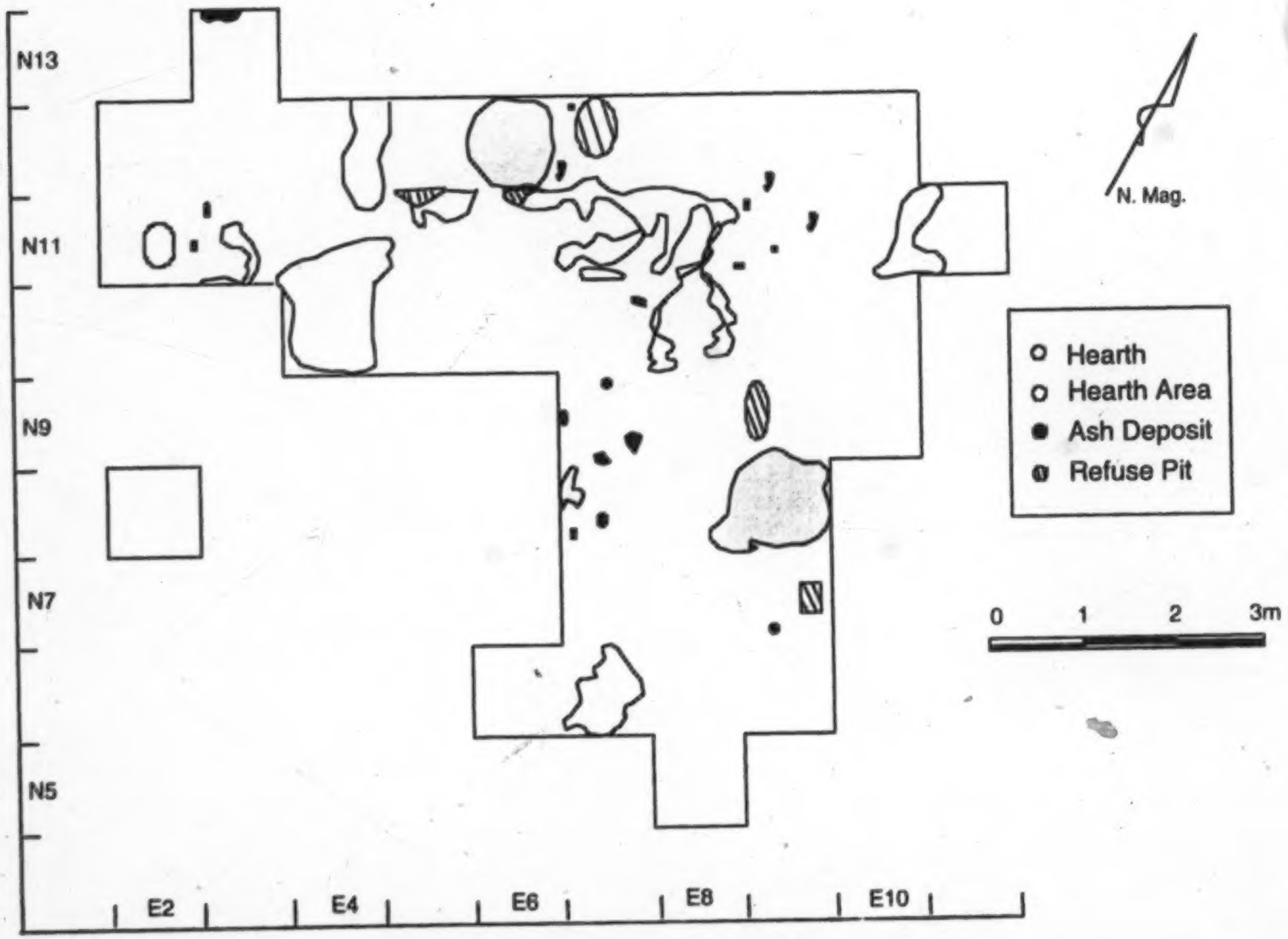

N13
N11
N9
N7
N5
E2
E4
E6
E8
E10
N. Mag.
○ Hearth
○ Hearth Area
● Ash Deposit
● Refuse Pit
0
1
2
3m

Figure 5. Map Representing the Features from the 1997 Excavation

Table 1. List of Metric and Non-Metric Attributes of the Features at MIVm-4

Feature No.	Unit(s)	Type	Status*	Dimensions LxWxT (cm)	Outline	Contents**
1985	**Features**					
1	S5W11	Hearth	P	25x25	Square	AR, CH, FCR
2	S9W15	Hearth	P	100x100	Square	AR, CH, FCR
3	S5W11	Hearth Area	P	100x75	Irregular	CH, B
4	S2W8	Hearth Area	P	100x100	Square	AR, B, CH, FCR
5	S9W15	Depression	P	400x400	Rectangular	AR, B, CH, WS
6	S5W1	Depression	P	1000x600	Irregular	AR, B, CH, WS
1997	**Features**					
7	N11E2	Hearth	C	50x31x6	oval	AR, CH, B, FCR
8	N12E6	Hearth	C	50x31x6	Square	AR, CH, FCR
9	N8E7	Hearth	C	49x40x6	Irregular	CH, B
10	N11E5/6	Hearth	C	80x50x10	Irregular	CH, B, FCR
11	N6E7	Hearth Area	P	141x127x7	Irregular	AR, B, CH, FCR
12	N11E3	Hearth Area	P	83x67x9	Irregular	AR, B, CH, FCR
13	N10E8 N11E6/7/8 N12E7	Hearth Area	C	200x182x9	Irregular	AR, B, CH, FCR
14	N8E8/9 N9E9	Hearth Area	C	141x127x7	Rectangular	AR, B, CH, FCR
15	N11E10 N11E11	Hearth Area	P	90x72x8	Irregular	AR, B, CH, FCR
16	N10E4 N11E3/4 N11E5	Hearth Area	C	153x114x10	Irregular	AR, B, CH, FRC
17	N11E4/5 N12E4/5	Hearth Area	P	136x64x10	Irregular	CH, FCR
18	N11E9	Ash Deposit	C	21x8	Elongated	CH, FCR
19	N7E9	Ash Deposit	C	10x8	Circular	B
20	N10E7	Ash Deposit	C	15x9	oval	
21	N9E9	Ash Deposit	C	12x9	Circular	
22	N11E3	Ash Deposit	C	16x10	oval	CH
23	N11E3	Ash Deposit	C	12x8	Semi-Circ.	B, CH
24	N6E8	Ash Deposit	C	21x12	Semi-Circ.	B, CH
25	N12E7	Ash Deposit	C	11x8	Circular	CH
26	N12E7	Ash Deposit	C	26x17	Triangular	CH
27	N11E9	Ash Deposit	C	23x14	oval	CH
28	N11E9	Ash Deposit	C	22x17	Rectangular	CH

Table 1. Continued

Feature No.	Unit(s)	Type	Status*	Dimensions LxWxT (cm)	Outline	Contents**
29	N11E9	Ash Deposit	C	8x6	Circular	CH
30	N11E9	Ash Deposit	C	8x5	Circular	CH
31	N8E7	Ash Deposit	C	14x15	oval	CH
32	N8E7	Ash Deposit	C	20x11	oval	CH, FCR
33	N13E3	Ash Deposit	C	40x7	Semi-Circ.	CH
34	N9E7	Ash Deposit	C	10x4	oval	B, CH, FCR
35	N9E7	Ash Deposit	C	10x5	oval	CH
36	N9E7	Ash Deposit	C	18x5	Triangular	CH, FCR
37	N9E7	Ash Deposit	C	18x13	Irregular	CH
38	N12E7	Refuse Pit	C	75x46x34	oval	AR, B, CH, FCR
39	N6E9	Refuse Pit	C	36x26x7	Rectangular	AR, B, CH, FCR
40	N11E5 N12E5	Spc. Refuse Pit	C	85x36x7	Semi-Circ.	FCR
41	N11E6	Spc. Refuse Pit	C	64x10x9	Semi-Circ.	CH, FCR
42	N11E7	Spc. Refuse Pit	C	62x13x25	Semi-Circ.	CH, FCR
43	N9E9	Cache	C	63x26x18	oval	AR, B, FCR

* C-Completely excavated; P-Partially excavated

** AR-Artifacts; CH-Charcoal; B-Bone; FCR-Fire-cracked Rock; WS-Wood Structural Element

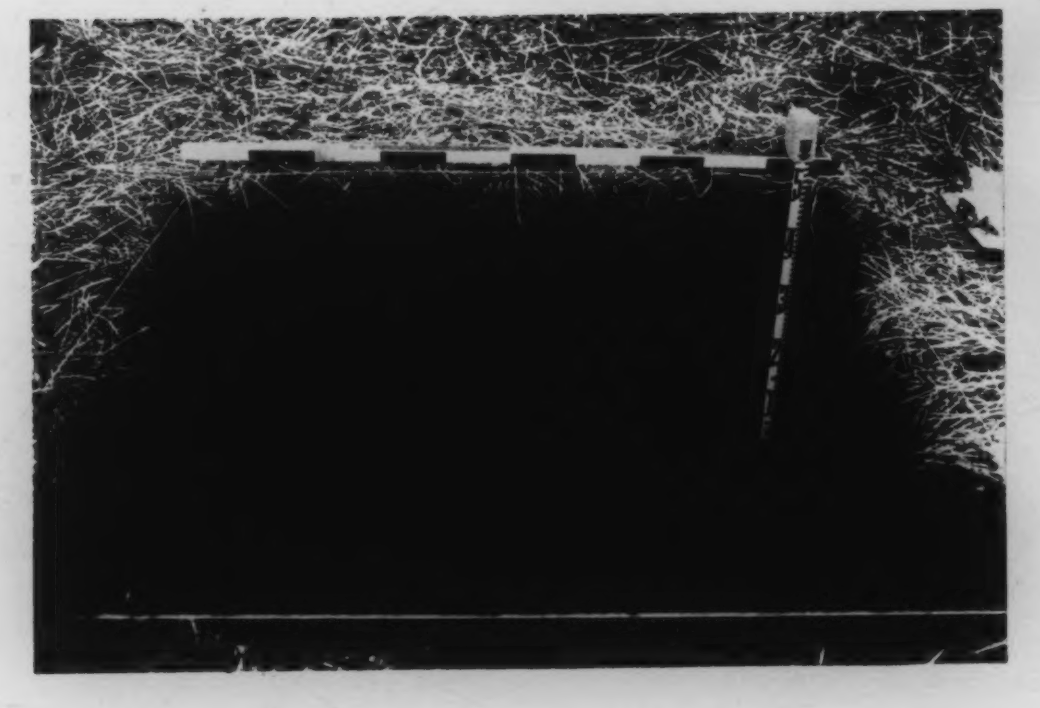


Plate 3. Hearth Feature Displaced by a Frost Crack

Ash Deposits (N=20)

Ash deposits represent close to 60% of the hearth features at MlVm-4. This confirms the fact that there has been a high level of disturbance and redeposition at the site. The average measurements of the ash deposits are 17 x 10 cm. Of these, 85% contained charcoal, but only 20% and 15% of the features respectively comprised fire-cracked rock and bones. No artifact was found in any of these deposits.

Pits (N=6)

Pits constitute the second category of features at MlVm-4. Two classes can be distinguished. The first one includes middens and specialized refuse pits, while the second one is represented by cache pits. Five of the six pit features encountered at Dechyoo Njik fall into the first category and only one is contained in the second class. All pit features but one were found in level 2. The exception, a refuse pit, cut a few centimeters into the third level.

Refuse Pits (N=5)

These features are artificial depressions that are thought to have been used as middens because of the composition of their filling. Of the five refuse pits, two have been classified as multi-purpose middens, while the three remaining are specialized refuse pits. The first multi-purpose refuse pit was located in level 2 of unit N12E7 (Plate 4). It contained a very dense organic fill. In addition, an impressive quantity of birch bark fragments (some of them cut), wood chips, fish scales, bones, charcoal bits and fire-cracked rocks were collected. A blunt arrowhead was also found in the pit (Plate 13). There was no identifiable pattern in the disposition of the material into the pit and everything was mixed up, from top to bottom.

The second midden of this type was located in unit N6E9; its filling was highly organic. It also contained bones, fire-cracked rocks, wood chips, charcoal, birch bark fragments and spruce needles. A concentration of birch wood and birch bark was found at the bottom, in the east part of the pit, but no orientation pattern was identified.

The last three refuse pits have been interpreted as specialized middens, for they were almost exclusively filled with fish scales. The first pit was localized in units N11E5 and N12E5 and was dug within a hearth. It contained only fish scales and a few fire-cracked rocks. The second pit was in unit N11E6 and was also located in the perimeter of a hearth. Some ash and charcoal were present. The last of these middens was found in unit N11E7. In addition to fish scales, a few fire-cracked rock and some charcoal were collected in the pit.

Caches (N=1)

The cache feature found in unit N9E9 is very similar to the refuse pits in terms of construction and composition. However, because of some distinctive construction characteristics, the use of this feature as a refuse pit appears to be a secondary function. The depression, oval in shape, was about 63 cm long, 26 cm wide and 18 cm deep. The content was very fibrous. Several sticks oriented in a north/south direction were found. The fill also contained an impressive quantity of fish scales, spruce needles, bark pieces (two of which were cut), bone fragments and charcoal bits. A few wood chips and fire-cracked rocks were also found. Close to the bottom of the pit, a large piece of cut birch bark measuring 20 x 10 cm was collected (Plate 5). A piece of cut log was located beside it, and underneath the birch bark was a spruce stick along with large quantities of spruce needles. Some of the characteristics of this pit can be recognized in Osgood's description of the fish caches used by the Peel River Gwitchin (Osgood 1970: 51-52):

> One of the commonest type of caches for storing fish is made by digging a hole in the ground and lining it with sticks. The fish are thrown in and layers of spruce bark are placed on top. Finally the hole is covered with heavy logs and debris and even trees may be felled as a last protection against disturbance. This type of cache serves in the late autumn when no more rains fall and the fish freezes.

Thus, the oriented sticks found in the pit at MlVm-4, along with the birch bark slab and the underneath stick were probably part of a storage facility. At Dechyoo Njik, however, spruce branches were used in the construction of the cache.

It is somewhat surprising that only one cache was identified at the site. Osgood mentions that this type of cache was used only in the fall, when the fish freezes. Thus, it is possible that the occupations at Dechyoo Njik generally occurred during the spring and summer and that the fish was smoked and stored in different kinds of structures. Another explanation could be a problem of archaeological visibility. It is quite possible that the features identified as multi-purpose refuse pits first served as storage locations. The subsequent utilization of these pits as middens may have entirely disturbed the constructions so that no pattern could be recognized in the position and orientation of the wood sticks and birch bark fragments contained in the features.

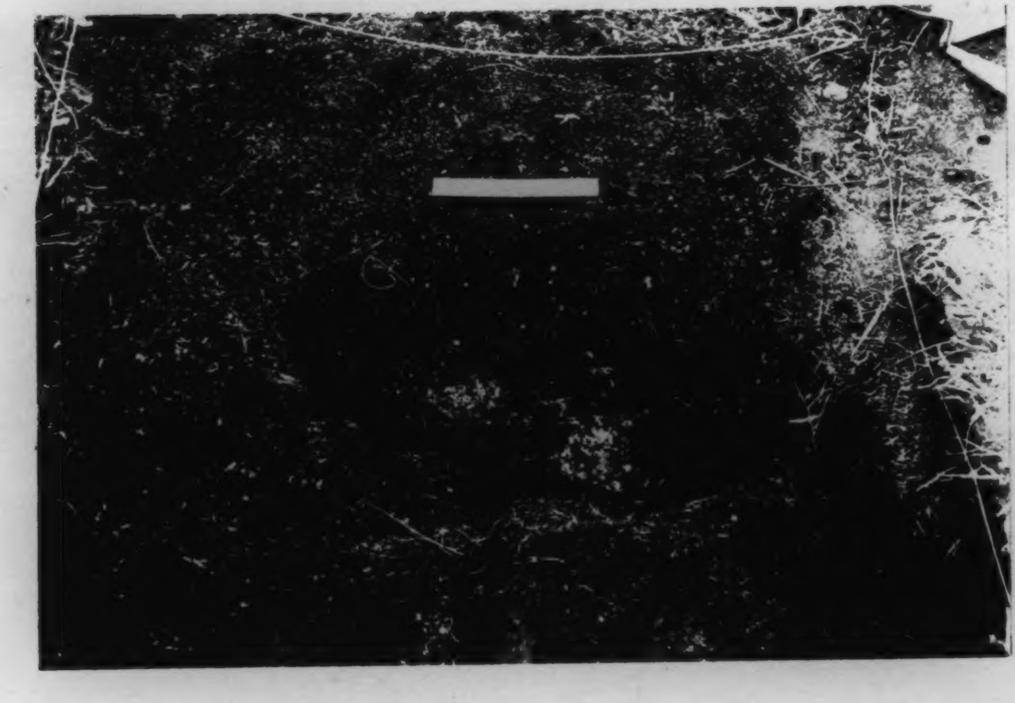


Plate 4. Multi-Functional Refuse Pit (Unit N12E7)

Plate 5. Cache Feature (Unit N9E9)

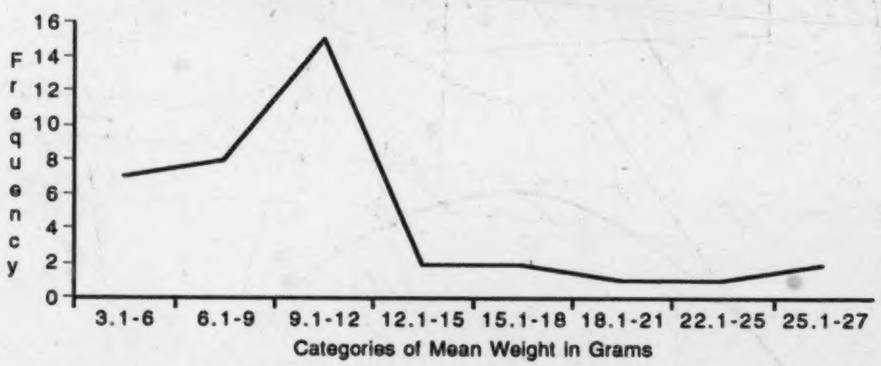
Depressions (N=2)

Two depressions wre identified at the east and west ends of the site (Figure 4). Remains of wood structural elements were found in both depressions, along with some historic artifacts (beads and metal fragments), faunal remains and charcoal. In 1985, a section of a large hearth surrounded by charcoal dust was found in the center of the eastern depression. Dried spruce cones were discovered along the east wall of the west depression. According to Elder Charlie Peter Charlie, those were used to line base of the walls (Le Blanc 1986: 70). These features were not investigated in 1997.

Fire-Cracked Rock

There were 3911 fire-cracked rocks collected during the 1983, 1985, and 1997 excavations. Most of them are fragments of quartzite cobbles. Figure 6 presents the mean weight for all the specimens and Figure 7 illustrates the density distribution of fire-cracked rock . Since quartzite is not available in the vicinity of the site, the rocks used for boiling water and cook food had to be imported. When I asked the elders about their provenience, Charlie Peter Charlie suggested that suitable rocks were collected in the mountains (10/07/1998). Quartzite cobbles can also be found in the bed of the Porcupine River.

Figure 6. Frequency of Fire-Cracked Rock Mean Weight per Units



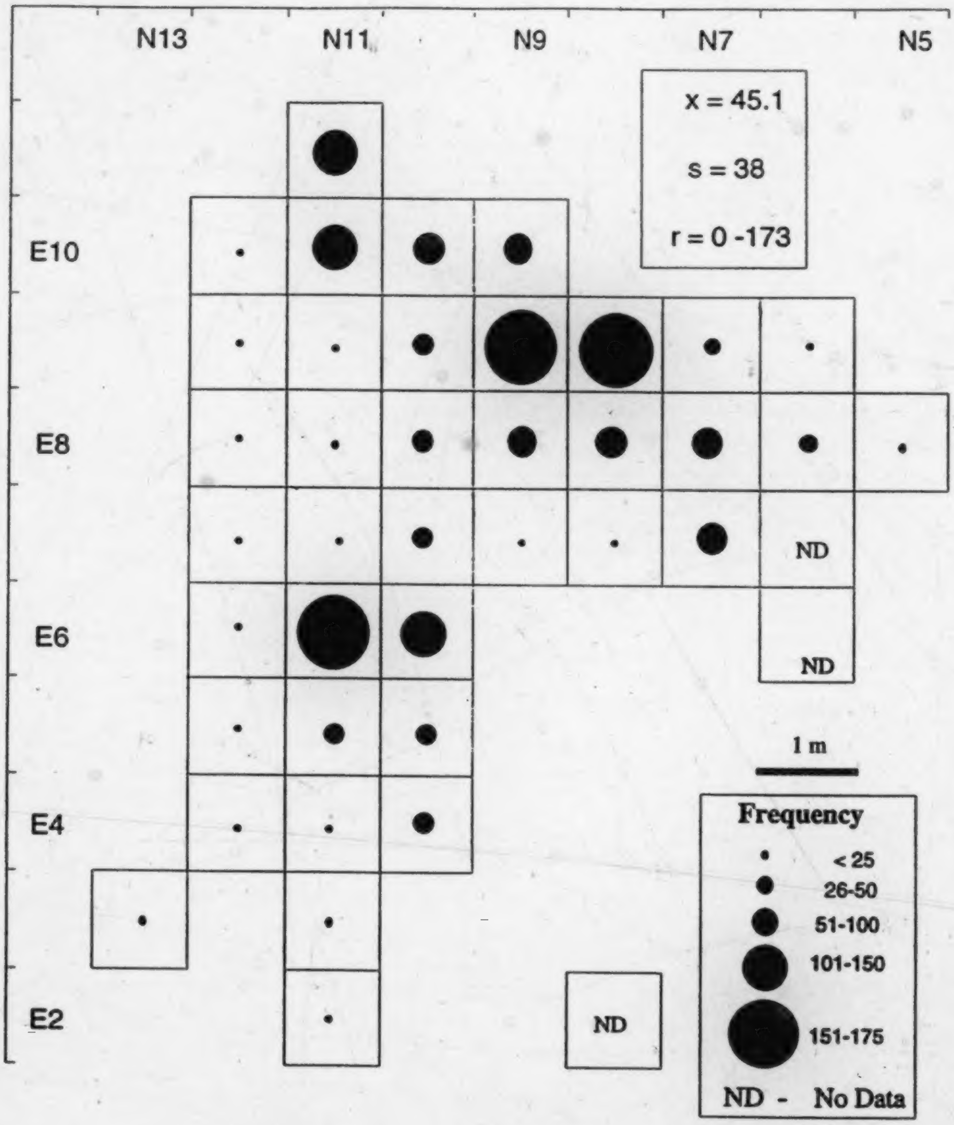

N13
N11
N9
N7
N5
E10
E8
E6
E4
E2
x = 45.1
s = 38
r = 0 -173
ND
ND
ND
1 m
Frequency
< 25
26-50
51-100
101-150
151-175
ND - No Data

Figure 7. Density Distribution of Fire-Cracked Rock

CHAPTER 4

The Lithic Industries

Introduction

This chapter presents the description and analysis of the lithic artifacts collected at MlVm-4 during the 1997 excavation and the 1983 and 1985 test operations. The first part explains the descriptive and analytical approach, while the second section presents the description, analysis and interpretation of each individual lithic class.

Descriptive and Analytical Approach

Following Le Blanc's (1984) morpho-technological approach, the lithic artifacts from Dechyoo Njik were divided in two broad categories according to their raw material. The first class consists of all cryptocrystalline (i.e., chert, chalcedony) artifacts. The second category includes coarse stone materials (i.e., quartzite, siltstone and slate). Both classes are called "industry", referring "to the use of broad categories of raw material; each industry can involve more than one technological process and processes can overlap each industry (e.g., percussion flaking of chert or quartzite cores)" (Le Blanc 1984: 53).

In order to facilitate inter-regional comparisons, descriptive categories of the lithic assemblage at Dechyoo Njik follow the standard typology developed for the Late Prehistoric Period of the northwestern interior sites in the Yukon Territory. The by-products of tool making have also been studied in order to document the manufacturing processes of tool making at MlVm-4. According Le Blanc's analytical model (1984: 54) the industrial products (i.e., cores and flakes) are first described and analyzed, followed by the modified debitage and the different categories of tools identified in the assemblage.

Orientation rules are the following: the dorsal surface is uppermost and faces the observer, the ventral face is the opposite surface. The proximal end is closest to the observer and the distal end is farthest away; the left and right margins are to the left and right of the observer when the dorsal ventral is uppermost. For flake artifacts, the ventral and dorsal surfaces correspond to the interior and exterior surfaces of the flake blank. The proximal end refers to the platform end, while the distal end corresponds to the end opposite the platform. If the typical characteristic of the blank is not evident, the hafting end of the artifact is proximal and the functional end is distal. The dorsal end is considered to be the more convex of the two faces.

Part I: The Cryptocrystalline Industry

The cryptocrystalline industry at Dechyoo Njik is composed almost exclusively of local chert of various colors (93.3%). Chalcedony also figures in the assemblage but only in small proportions (6.7%). The exact source of this material is not known, but it is thought to be available in the region, somewhere in the mountains and/or along the Porcupine River (Le Blanc, pers. comm., 1998). A single obsidian flake indicates the use of exotic raw material for the production of stone tools.[1] Sources of obsidian are known in central Alaska as well as in the southern Yukon Territory (Carlson 1994). All the cryptocrystalline artifacts (N=211) recovered at Dechyoo Njik in 1983, 1985 and 1997 are included in the present analysis.

Debitage

The debitage products at Dechyoo Njik include 194 artifacts. Eight different attributes were used for the description and the technological analysis of the debitage. Most of those are useful in determining the stage of lithic production represented by the debitage (Magne 1989: 16-18). The attributes are as follows:

1. *Debitage Type:* Five different categories of debitage products have been recognized in the assemblage of Dechyoo Njik. Those include pebble cores, core fragments, core reduction flakes, biface reduction flakes and shatter.

2. *Raw Material:* Chert and chalcedony are the only two different raw materials that were identified among the debitage of MlVm-4.

3. *Debitage Size:* 5 x 5 mm size categories (e.g., 0-5, 6-10, ... 50 x 50) were used to group the debitage products.

4. *Weight:* Each artifact was weighed to the nearest 0.1 g.

5. *Percentage of Cortex:* The percentage of cortex on the debitage was recorded into four categories: 0%, <50%, >50% and 100%. The early stage of reduction is usually characterized by a higher percentage of cortex on the dorsal surface, and this percentage disminishes as the reduction proceeds (Magne 1989: 17-18).

6. *Dorsal Surface Scars:* The number of dorsal scars on the debitage was grouped into three categories: 0-1 scars, 2 scars, >=3 scars. The number of dorsal surface scars is known to increase through the reduction process (ibid., 17). Consequently, the three descriptive categories respectively represent the early, middle and late stages of reduction.

7. *Platform Scars:* The number of platform scars was recorded in the same manner as for the dorsal scars. The frequency of platform scars also increases as reduction goes on

---

[1] Although obsidian is not a cryptocrystalline rock, it has been included in this category for the analysis.

(Magne 1989, 17). However, this attribute is sometimes difficult to record on small platforms or on specimens presenting evidence of ginding.

8. *Platform Grinding:* For each debitage artifact, this attribute was recorded as "present" or "absent". Platform grinding may indicate platform preparation technique or use of the debitage products (Le Blanc 1994: 56).

Table 2 summarizes the distribution of the various debitage types according to their raw material.

Cores (N=10)

The cores collected at MlVm-4 were all made chert. Four of them are pebble cores (Plate 6), and six are core fragments. All the pebble cores come from waterworn pebbles. Since these cannot be found in the vicinity of the site, they had to be brought in from another location. The closest source was probably the bed of the Porcupine River, located about 40 km south of the site. No chalcedony cores or chert cores of colors other than black and grey were recovered. Thus, it is likely that those materials were brought to the site as blanks or finished implements. Of the four pebble cores, three were exhausted. Table 3 provides summaries of weights for the cores and the core fragments; Figure 8 shows the distribution of sizes for both categories. The divergent positions of the two distributions reflect a noticeable diminution in size as reduction is carried on. Only one pebble core and two core fragments retained some cortex cover. For all of them, cortex represented less than 50% of the total surface.

Flakes and Shatter (N=184)

The summaries of weights for bifacial and core reduction flakes and shatter is presented in Table 4. Figure 9 shows the distributions of sizes of each of these debitage categories. As expected, bifacial flakes tend to be smaller than core reduction flakes and shatter. The fact that the shatter have the same size distribution as the cores is probably the result of the small size of the cores, which influences the size of the shatter in the same way as that of the flakes detached during the first stage of reduction; as reduction goes on and the size of the flakes detached decreases, the size of the shatter similarly diminish.

Figure 10 displays reduction curves for bifacial and core reduction flakes. The greatest frequency of core reduction flakes occurs in the early stage of production, while the bifacial flakes mostly represent the later stage of reduction. This may suggest little early bifacial reduction at the site itself and the introduction of preforms of finished tools. For both flake categories, the middle stage of reduction is the least represented, with only 14.3% of the bifacial flakes and 19.3% of the core flakes falling into this category.

Table 2. Summary of Debitage Type by Raw Material

Debitage Type	Chert N	Chert %	Chalcedony N	Chalcedony %	Totals N	Totals %
Bifacial Flakes	43	87.8	6	12.2	49	25.3
Core Reduction	53	93.0	4	7.0	57	29.4
Shatter	75	96.2	3	3.8	78	40.2
Pebble Cores	4	100.0			4	2.1
Core Fragments	6	100.0			6	3.1
Subtotals	181	93.3	13	6.7	94	100.1

Table 3. Summary Weight Statistics for Cores and Core Fragments

Core Type	N	Mean	S.D.	Min.	Max.
Pebble	4	15.3	5.6	10.7	24.9
Core Fragments	6	6.1	2.0	4.3	9.8

Table 4. Summary Weight (g) Statistics for Flakes and Shatter

Type	N	Mean	S.D.	Min.	Max.
Core Reduction	57	1.0	1.1	0.1	4.4
Bifacial Flakes	49	0.2	0.14	0.0	0.6
Shatter	78	0.89	0.85	0.0	7.8

Figure 8. Size Distribution of Cores and Core Fragments

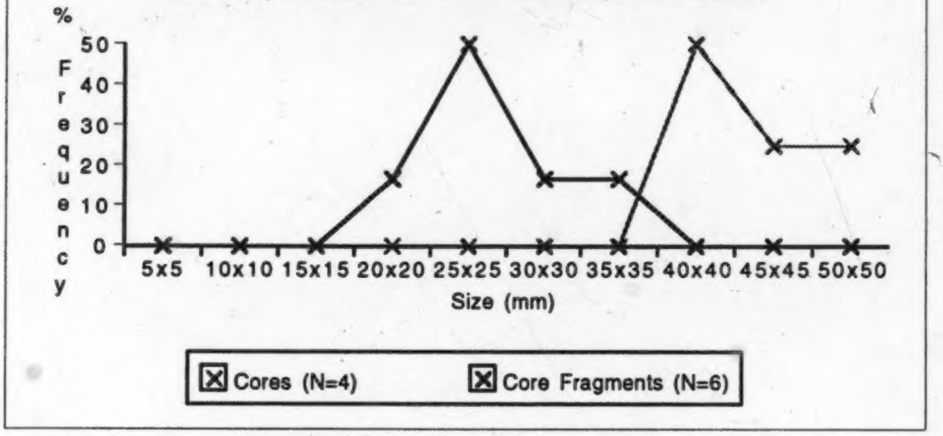


Figure 9. Size Distributions for Debitage Classes

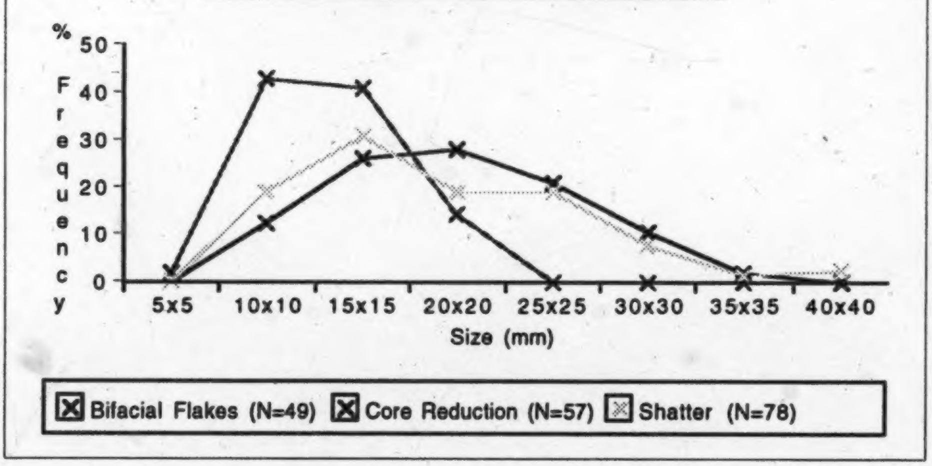
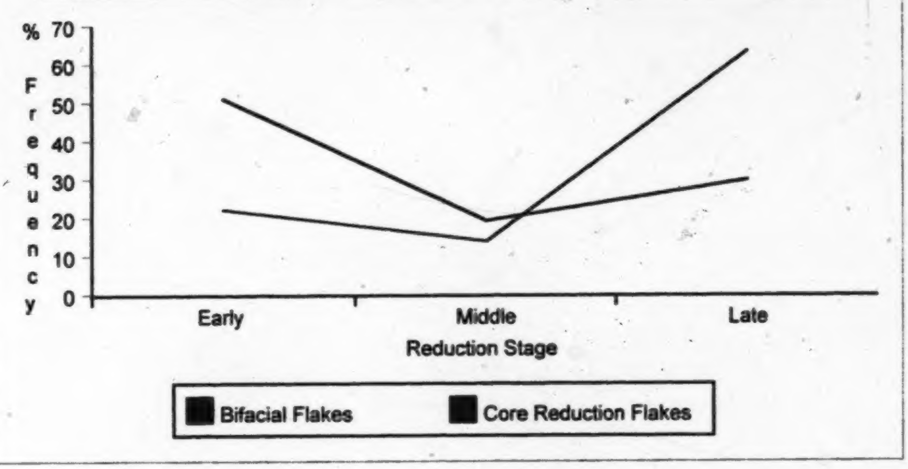


Figure 10. Reduction Stages Distributions for Bifacial and Core Reduction Flakes



The percentage of cortex on the core reduction and bifacial flakes suggests that both categories mostly represent the later stage of reduction. Overall, 86% of the core flakes and 95.9% of the biface flakes have no cortex on their dorsal surface and platform. Only 1.8% of the core flakes and 2% of the bifacial flakes present a cortex cover of 100%.

Platform grinding was observed on 14% of the core reduction flakes, and on 10.2% of the bifacial flakes. The fact that core reduction flakes exhibit more of this attribute is surprising. This could indicate that core reduction flakes were used in some manner. Platform grinding on bifacial flakes can be either the result of platform preparation technique or use-wear reflecting edge resharpening on worn bifacial implements.

Modified Flakes (N=5)

This class of artifacts comprises flakes and shatter that present edge alterations, as the result of intended modification or the consequence of use in cutting or scraping activities. The sample includes only five modified flakes of which three are shatter, one is a core flake and one is a bifacial flake. All modified flakes are made from chert (#45, 136, 1193), with the exception of one chalcedony bifacial flake (#1007) and a retouched obsidian shatter (#1558). The latter is the only evidence of exotic raw material at Dechyoo Njik.

All of the modified pieces except the retouched core flake exhibit modification on a single edge. All three shatter, as well as the bifacial flake are retouched along one of their lateral margins. The core flake was retouched along the left margin; a section of its distal edge was also modified.

The mean weight for the five modified flakes is 2.46 g and the mean size is 30x30 mm. If we compare those measurements with Table 4 and Figure 9, which show mean weights and size distributions for the unmodified debitage, it seems that as a rule, the retouched flakes are larger than their unmodified counterparts. This tends to demonstrate that larger pieces of debitage were purposely selected to be either transformed or used as expedient tools.

Bifaces (N=1)

The only biface collected is the distal fragment of a small biface made of grey chert, probably ovoid in shape (Plate 7, #1151). It is 7.69 mm thick and weighs 2.3 g. It presents evidence of alteration resulting from intentional modification or use on all margins. From the worn edges of the specimen, it is evident that the tool was heavily used before being discarded.

Scrapers (N=3)

Three scrapers were collected at MlVm-4 (Plate 7). Since one is burinated, it has been analyzed in the burin category. Of the two remaining specimens, one is a end-scraper and the other is a spokeshave scraper. The former (#1423: l. 17.64 mm, w. 23.16 mm, t. 5.24 mm, wt. 2.2 g) is a chert piece of shatter roughly triangular in shape. The distal end of the tool is pointed and has been retouched on one side. The modified margin is dulled and worn. The proximal end of the scraper is covered with cortex.

The spokeshave scraper (#1160: l. 32.42 mm, w. 22.28 mm, t. 8.82 mm, wt. 7.2 g) was also made from a piece of chert shatter. The specimen is rectangular in shape and presents a retouched concave notch on the distal half section of the right margin. The dorsal surface of the tool is almost entirely covered with cortex.

Pièces Esquillées (N=6)

This category of artifacts is defined by Le Blanc as a class "including flake-based lithic specimens which have opposed crushed margins or crushed margins opposite flat surfaces which may be platforms or basal areas" (1984: 183). Pièces esquillées are thought to be indicators of a bipolar percussion technique of reduction.

The typological categories used to describe and analyze the pièces esquillées recovered at Dechyoo Njik are the same as those developed by Le Blanc (1984: 185) for the Rat Indian Creek site. There are six distinct categories including: (1) specimens with opposed crushed margins that are perpendicular to the normal axis of the flake; (2) specimens with crushed margins on the primary and secondary platform on the respective proximal and distal ends of the flake; (3) bipolar flakes; (4) columnar flakes; (5) miscellaneous shatter; (6) specimens resembling small bifaces but resulting from bipolar technique. I created a seventh (7) category in order to represent bipolar cores. Those were also found at Rat Indian Creek, but were grouped with the cores.

Only six pièces esquillées were collected at MlVm-4 (Plate 8). All of them are made from chert. The first specimen is a bipolar core fragment (#1373: l. 32.71 mm, w.22.18 mm, t. 11.34 mm, wt. 7.0 g). It has a columnar surface on one edge that resembles a burin scar.

The next three specimens fall into the second category of pièces esquillées. All these flakes present crushed margins on their proximal and distal ends. The first one (#1415: l. 20.87 mm, w. 16.07 mm, t. 6.70 mm, wt. 1.5 g) is broken at the proximal end and therefore, the platform is missing. It was also retouched all along the right margin of the ventral surface. The second example (#1424: l. 21.72 mm, w. 13.14 mm, t. 4.09 mm, wt. 1.4 g) has a triangular distal end which exhibits evidence of crushing on the left side only. The last flake (#1562: l. 21.28 mm, w. 17.39 mm, t. 5.99 mm, wt. 2.4 g) is roughly triangular in shape and has both proximal and distal ends completely crushed.

Another pièce esquillée (#1359: l. 29.97 mm, w. 23.49 mm, t. 11.95 mm, wt. 9.1 g) is a large bipolar flake with a platform remnant on one extremity and a crushed area on the opposite end. The dorsal surface of the flake is partially covered with cortex.

The last example is a columnar flake (#1000). The specimen has a narrow rectangular outline and a rectangular cross-section. Both its proximal and distal ends present evidence of crushing.

Burin (N=1)

One lateral burin made of black chert was collected (#1357: l. 44.92 mm, w. 32.43 mm, t. 6.11 mm, wt. 10.2 g.; Plate 7). The burinated surface is located on the right edge of the specimen and starts from the proximal end. It measures 31.91mm long by 5.53 mm wide. One of the lateral margins of the tool shows evidence of modification, probably as a result of being used as a tool. In addition to being used as a burin, the specimen has also been transformed into a end-scraper. The dorsal surface of the distal end has been retouched on its entire length to create a sharp edge.

Microblade Core Tablet (N=1)

A microblade core tablet was found at the site (#1144: l. 22.91 mm, w. 15.08 mm, t. 5.1 mm, wt. 1.8 g.; Plate 7). The specimen is made of grey chert. Flake scars appear on the top of the core tablet indicating that the platform was prepared before the microblades were detached. Flake scars are also visible along the right margin of the specimen, where the blades came off. A platform and a bulb of percussion indicate the location where the tablet has been struck in order to be removed. This artifact and the burin described above are not part of the Klo-kut Phase component; their significance will be discussed in the conclusion of this chapter.

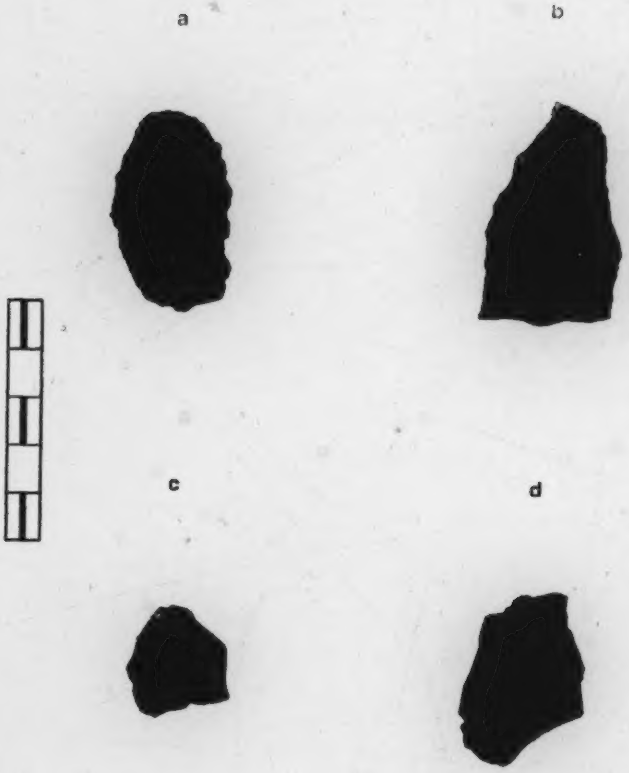


Plate 6. Chert Core Pebbles. (a) 1006, Level 2; (b) 1157, Level 2; (c) 1366, Level 1; (d) 1253, Level 1.

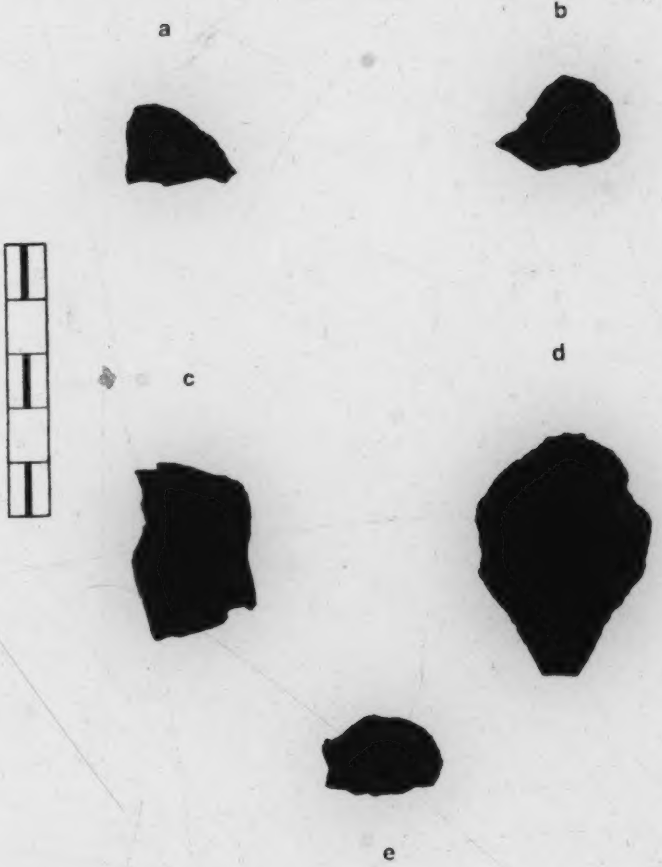


Plate 7. Chert Biface Fragment (a), Scrapers (b-d), and Microblade Core Tablet (e). (a) 1151, Level 2; (b) 1423, Level 2; (c) 1160, Level 2; (d) 1357, Level 2; (e) 1144, Level 2.

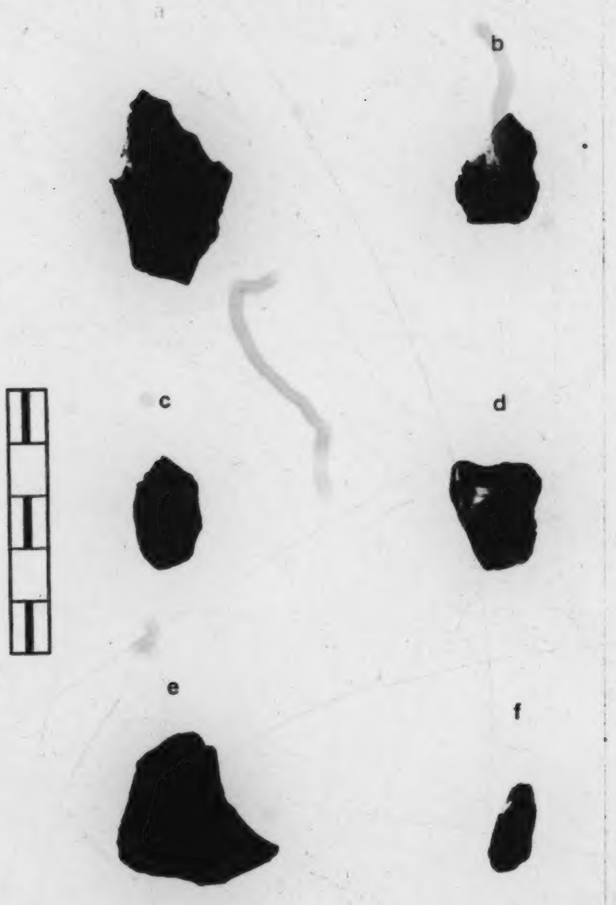


Plate 8. Chert Pièces Esquillées. (a) 1373, Level 2, Bipolar Core Fragment; (b) 1415, Level 2; (c) 1424, Level 2; (d) 1562, Level 2; (e) 1359, Level 2, Bipolar Flake; (f) 1000, Level 2, Columnar Flake.

Part II: The Coarse Stone Industry

This section describes the lithic artifacts made from coarse stone materials. The most common raw material at Dechyoo Njik is undeniably quartzite; only a few items are made from slate, siltstone and basalt. Three categories of tools made of coarse stone materials were found at the site. The most numerous class is composed of tabular bifaces. An adze and a few grinding tablets were also collected. This section also includes the description and analysis of several hematite fragments found at the site.

Tabular Bifaces (N=80)

Tabular bifaces are defined as "pieces of tabular raw material (most often a coarse, layered stone) which have been bifacially retouched along all or portions of their margins" (Le Blanc 1984: 276). A steel version of these tools is still used in Old Crow to scrape and soften various kinds of skins, mostly those of caribou and moose (Mary Kassi: 02/08/1998). At Dechyoo Njik, two complete specimens, one broken tool and 77 margin fragments or flakes were collected. Most of them were found in level 2 (Table 5). All three complete and broken tabular bifaces are D-shaped (Plate 9). With the exception of one complete specimen and four margin fragments, which were made from slate, all tabular bifaces were manufactured from quartzite. The complete and broken tools plus all fragments that are part of the distal edge of a tabular biface exhibit a dull margin indicating use wear. In addition, many specimens present polish on one or both surfaces (Table 6). Noteworthy is the fact that nearly 50% of the tabular bifaces exhibit red ochre on one or both faces (Table 7).

Metrical observations for the complete and broken tabular bifaces are presented in Table 8. The attributes that were measured for each category include the length, the width, the thickness, the weight, and the modified margin length. Length was measured along the shortest axis of the tools, from the center of the straight edge to the opposite convex margin. Width was measured on the perpendicular axis, along the straight margin of the specimens. Thickness represents the maximal thickness of each tabular biface. The weight has been averaged to the nearest tenth of a gram. Modified margin lengths were determined using a string. Metrical observations for the margin fragments are summarized in Table 9. Only the thickness and the weight have been measured for this category.

Discussion

Since quartzite and slate are not available in the vicinity of the site, raw material for the manufacture of tabular bifaces had to be brought in from another location. When I asked the Elders about the provenience of the quartzite material used for cooking at Dechyoo Njik, Charlie Peter Charlie suggested that it came from the mountains

(10/07/1998). Therefore, it is possible that the quartzite used for the production of tabular bifaces was also brought in from the mountains.

Considering the absence of significant quantity of quartzite or slate waste products, it is likely that tabular bifaces were brought to the site as blanks or finished implements. The few small quartzite flakes in the assemblage could represent the later stage of production. However, they could also be the result of resharpening processes. Consequently, there is no way to determine with certainty if the tabular bifaces were imported as finished tools or blanks.

It is the first time in the region that the presence of hematite has been observed on tabular bifaces. We know that the Gwitchin made extensive use of red ochre. Hodges notes, about the Vuntut Gwitchin, that "... their wooden objects are nearly always painted with red ochre, which is used also as a face paint." (1910: 883). Bone grease was usually used as a binding material to transform the red ochre into paint (Morlan 1973: 366). This form of red ochre was found at the Klo-kut site (ibid.). At Dechyoo Njik, various fragments of hematite -- most of them ground -- as well as a grinding tablets with red ochre were found.

Although it is a possibility, it is thought that the presence of hematite on the tabular bifaces did not serve a decorative purpose. The red ochre present on the tools at MlVm-4 was found as powder and was not transformed into paint. In most cases, the mineral was totally embedded in between the quartzite grains, as if hematite fragments had been abraded on the surface of the tabular bifaces. This assumption is strongly supported by the fact that 80% of the polished surfaces also exhibit red ochre. Although surface polish may be the result of hand-held or hafting abrasion (Le Blanc 1984: 277), the repeated occurrence of red ochre and polish on the same surface is unlikely to be a coincidence.

In fact, since stone material is a scarce resource in the local environment of the site, it is quite possible that people also used the tabular bifaces as abraders to grind hematite fragments. Apparently, quartzite is the ideal material for this purpose, and one of the two abraders found at the site is made of a quartzite cobble spall. Its entire inner surface is embedded with red ochre in exactly the same manner as the tabular bifaces. The other abrader is made of siltstone and does not present any evidence of hematite. Similarly, neither the complete tabular biface nor the margin fragments that are made from slate exhibit red ochre on their surfaces. I believe that this is because sandstone and slate are unsuitable materials for the grinding of red ochre. Those rocks are not as coarse as quartzite and their surfaces are probably too smooth to be of any help in transforming the mineral into powder.

Table 5. Distribution of Tabular Bifaces

Category	Level 1	%	Level 2	%	Level 3	%	Total	%
Complete	2	100.0					2	2.50
Broken			1	100.0			1	1.25
Margin Fragments	2	3.9	49	96.1			51	63.75
Rejuvenation Flatkes			5	100.0			5	6.25
Possible Fragments			11	100.0			11	13.75
Possible Flakes			10	100.0			10	12.50
Totals	2	2.5	78	97.5			80	100.00

Table 6. Distribution of Surface Polish on Tabular Bifaces

	One Surface		Two Surfaces		Not Evident		Totals	
Category	N	%	N	%	N	%	N	%
Complete	1	100.0	1	50.0	1	50.0	2	2.50
Broken	1	100.0					1	1.25
Margin Fragment	15	29.4	3	5.9	33	64.7	51	63.75
Rejuvenation Flakes					5	100.0	5	6.25
Possible Fragments					11	100.0	11	13.75
Possible Flakes					10	100.0	10	12.50
Totals	16	20.0	4	5.0	60	75.0	80	100.00

Table 7. Distribution of Red Ochre on Tabular Bifaces

	One Surface		Two Surfaces		Not Evident		Totals	
Category	N	%	N	%	N	%	N	%
Complete	1	50.0			1	50.0	2	2.50
Broken					1	100.0	1	1.25
Margin Fragments	20	39.2	7	13.7	24	47.1	51	63.75
Rejuvenation Flakes	2	40.0			3	60.0	5	6.25
Possible Fragments	20	18.2	2	18.2	7	63.6	11	13.75
Possible Flakes	2	20.0			8	80.0	10	12.50
Totals	27	33.75	9	11.25	44	55.0	81	100.00

Table 8. Distribution of Metrical Attributes for Complete and Broken Tabular Bifaces

		Average Length(mm)			Average Width(mm)			Average Thickness(mm)			Average Weight(g)			Modified Margin Length(mm)		
Category	N	x	s	r	x	s	r	x	s	r	x	s	r	x	s	r
Complete	2	59.8	6.8	54.9-64.6	96.4	3.0	94.3-98.6	5.2	1.0	4.5-6.0	39.4	1.6	38.2-40.5	154	39.6	126-182
Broken	1	71.7	---	—	106.8	—	—	3.2	—	—	41.2	—	—	92	—	—
Totals	3	63.8	6.0	54.9-71.7	99.9	4.6	94.3-106.8	4.5	0.9	3.2-6.0	40.0	0.8	38.2-41.2	133.3	27.6	92-182

Table 9. Distribution of Metrical Attributes for Fragments of Tabular Bifaces

		Thickness (mm)			Weight (g)		
Category	N	x	s	r	x	s	r
Margin Fragments	51	3.92	1.46	1.46-8.72	8.57	12.24	0.1-77.8
Rejuvenation Flakes	5	2.45	0.36	1.99-3.33	0.84	1.11	0.3-1.9
Possible Fragments	11	3.28	0.79	1.94-5.0	1.48	0.58	0.3-3.5
Possible Flakes	10	2.33	0.32	1.7-3.47	0.58	0.38	1.7-3.47

Multi-Functional Celt-Like Object (N=1)

A celt-like object made of basalt was found at the site (Plate 10). The specimen appears to be made from a naturally elongated, rectangular piece of material with a semi-circular cross-section. It is 157.0 mm long by 36.69 mm wide and 12.72 mm thick; it weighs 137.8 g. The tool has been notched in the middle of both lateral sides and there are transverse lines running from one notch to another that seem to indicate that the specimen was hafted and used as either an adze or an axe. Both the proximal and the distal end of the specimen have been used in pounding. In addition, the left lateral margin of the specimen is worn, from the middle part of the object to the distal end. This suggests that this margin, which is very thin, was probably used as a cutting tool. The right side of the specimen looks as if it has been pecked. The tool has also been ground on both sides, parallel to the long axis. Finally, some red ochre pigment is encrusted on the ventral surface of the specimen, suggesting that the specimen was used as a grinding tool or had been intentionally decorated.

Basalt is an extrusive igneous rock that is not a locally available product. It had to be imported through trade with other groups from Alaska or the Southern Yukon, natural sources of volcanic rocks. No basalt waste products were found at the site, thus indicating that if the object was not traded as a finished tool, it was shaped somewhere else before it was brought to the site.

Similar examples of this tool were also found at the Klo-kut and Rat Indian Creek. At the former site, four specimens were excavated and four others were discovered on the beach (Morlan 1973, 267-269, 553 Plate). Three comparable tools made from the same type of material were also collected at Rat Indian Creek (Le Blanc 1984: 291-292, 302 Plate 41).

Grinding Tablets (N=2)

Two grinding tablets were found at the site (Plate 10). The first one (#1311: l. 119.90 mm, w. 56.73, t. 28.88, wt. 220.2 g) is a section of a large quartzite pebble. The inner surface of the pebble was probably used to reduce red ochre in powder, since it is entirely covered with red hematite. The second abrader tablet (# 1149: l. 33.02 mm, w. 21.65 mm, t. 5.28 mm, wt. 6.0 g) is made from a rectangular fragment of siltstone. The specimen is slightly polished on both surfaces but it does not exhibit evidence of red ochre.

Miscellaneous

Hematite Fragments (N=11)

Several pebbles, pebble sections and mineral fragments identified to as red ochre have been collected at the site. The assemblage contains two complete pebbles, four pebble sections and five hematite fragments. Table 10 presents the metric and non-metric attributes of all the specimens. All the examples except a complete pebble and three small fragments show evidence of grinding on one or more facets. The smaller fragments were probably accidentally detached when larger pieces of hematite were being ground.

Hematite was found in great quantities in all cultural components at Klo-kut (Morlan 1973) but surprisingly no fragments were recovered at Rat Indian Creek. Hematite can be found along the Porcupine River (Morlan 1973: 364; Mason 1924: 43). Morlan reports that hematite is very commonly gathered in the form of river pebbles and that there are also two known locations on the Porcupine River, where deposits of hematite are accessible. The former is located on the Fishing Branch, about 640 river kilometers from Old Crow and the second one is about 80 river kilometers west of Old Crow, near the Alaskan border (Morlan 1973: 364). Apparently, most of the red ochre brought in to Dechyoo Njik was collected in the form of river pebbles. According to Morlan's informants, the nodules were broken and reduced into powder by grinding before being mixed with bone grease and used for painting. At MlVm-4, not all the nodules were broken before polishing but there is clearly evidence of grinding. No soft ochre resulting from the mixing of the mineral powder with bone grease was recovered at the site, as it was at Klo-kut (Morlan 1973: 366).

Table 10. Metric and Non-Metric Attributes of Hematite Fragments

No. Type	Length	Width	Thickness	Weight	No. of Polished Surfaces
1 Complete Pebble	64.73	47.00	30.71	126.9	0/6
2 Complete Pebble	37.65	18.81	12.98	25.3	6/6
3 Pebble Section	26.35	17.77	17.27	10.7	5/5
4 Pebble Section	26.68	10.58	11.19	4.9	4/6
5 Pebble Section	25.15	16.31	10.60	16.4	6/6
6 Pebble Section	27.55	11.67	9.12	6.6	3/3
7 Fragment	12.80	5.31	2.33	0.2	3/3
8 Fragment	21.28	13.53	4.18	3.2	2/5
9 Fragment	18.58	18.14	4.72	2.8	5/5
10 Fragment	19.77	7.79	4.42	1.1	1/4
11 Fragment	11.91	10.20	2.47	0.5	1/2
12 Fragment	6.49	5.19	3.51	0.1	0/6

Conclusion

Two major categories of raw materials were used for the production of lithic implements at Dechyoo Njik. The first one, which includes cryptocrystalline rocks, was mainly represented by local chert. The coarse stone industry for its part, was almost entirely composed of quartzite tools. There are significant differences in the way the two classes of lithic materials were treated in terms of reduction strategies. Exclusive tool types also characterize the cryptocrystalline and the coarse stone industries.

Small black chert warterworn pebbles were imported and subsequently reduced into blanks for the production of small flake tools. In addition, a great deal of material was introduced to the site as blanks or finished implements. Bipolar flaking was used in order to reduce the cores, although other primary reduction techniques were also employed. In fact, most of the tools collected (i.e., modified flakes and scrapers) indicate the manufacture of simple implements made with edge-shaping techniques. Size comparisons between unmodified debitage and retouched flakes and scrapers indicate that larger blanks were intentionally selected for the production of those tools. Apparently, bifacial flaking was also used for the fabrication of tools, since over 25% of the unmodified debitage has been identifed as by-products of bifacial reduction. However, the inadequate size of the cores for bifacial production or/and the small size of the bifacial flakes, suggest that bifaces were imported as finished implements and that only edge resharpening activities were performed at MlVm-4.

The coarse stone industry at MlVm-4 is characterized by the manufacture of large tools represented almost exclusively by the reduction of tabular slabs of quartzite. Apart from a basalt celt-like object and two grinding tablets, all the tools made from coarse stone materials are tabular bifaces. Since no quartzite or slate core nuclei were found, it appears that these tools were introduced to the site as blanks or finished implements. In addition, no basalt by-products were collected, thus indicating that the celt-like object had been imported as a finished tool.

In most respects, the lithic industries at Dechyoo Njik are representative of the lithic technology which characterizes the Late Prehistoric Period in the northwestern Yukon (Le Blanc 1984, Irving and Cinq-Mars 1974, Morlan 1973). Two artifacts, however, clearly appear to be from an earlier period (Le Blanc, pers. comm., 1999; Irving and Cinq-Mars 1974). These are the microblade core tablet and the lateral burin. Although Morlan (1973: 231-33) states that a few burins were found at the Klo-kut site, in fact, most of these appear to be the result of bipolar technology (Le Blanc, pers. comm., 1999). No evidence of microblades or burins was found in any of the cultural components at Rat Indian Creek. The earlier occupation of the site, which took place during the Old Chief Phase of the Late Prehistoric sequence in the northern Yukon started around 2850 B.P.

Radiocarbon dating was used in order to determine whether the two artifacts were introduced to Dechyoo Njik during the Late Prehistoric or Historic Period, or if there is a possibility for an earlier occupation at the site. A piece of log found deep in the permafrost was dated in order to establish the age of the point bar on which the site is located. The log was dated to about 1 000 years B.P., thus indicating that the point bar is too recent for the occurence of an occupation at the site before the Klo-kut Phase. Therefore, the burin and the microblade core tablet have probably been collected by the site's occupants while on a foray to some other region of their territory, and brought to Dechyoo Njik.

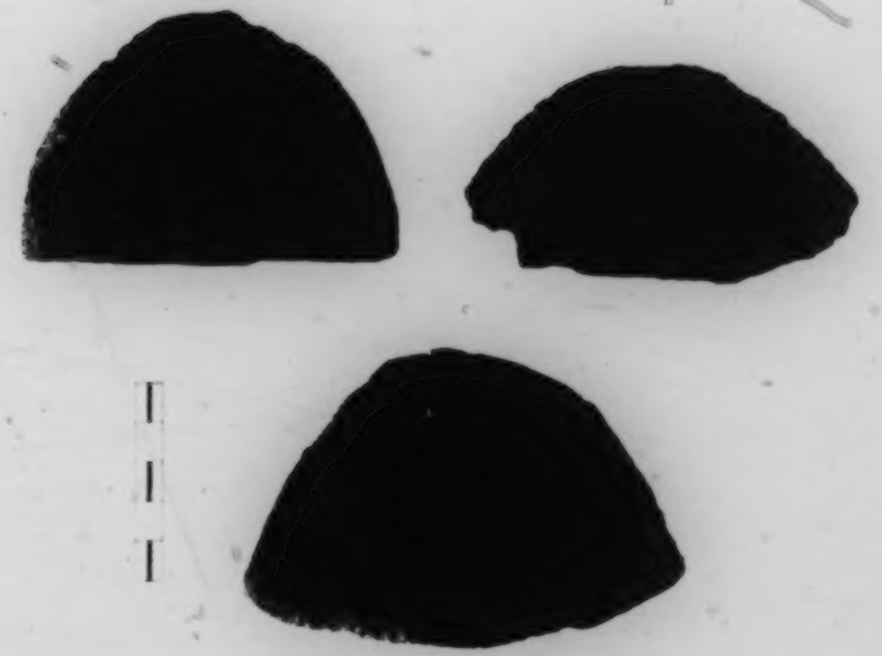


Plate 9. Tabular Bifaces. (a) 1207, Level 2; (b) 1053, Level 2; (c) 1109/11/12/13, Level 2.

Plate 10. Coarse Stone Tools. (a) 17, Level 3, Multi-Functional Celt-Like Object; (b) 1311, Level 2, Quartzite Grinding Tablet; (c) 1149, Level 2, Siltstone Abrader Fragment.

CHAPTER 5

Bone and Antler Industry

Introduction

Various bone and antler artifacts were recovered during the excavation at Dechyoo Njik. The close proximity of the permafrost to the surface and the humus cover, which provides insulation, create ideal conditions for the preservation of these organic materials. Except for three specimens from level 1, all the bone and antler artifacts were collected in level 2. The assemblage is composed of some very refined and carefully worked tools, but it also includes various fragments that are characteristic by-products of tool manufacturing. Le Blanc (1984: 306-312) has developed a comprehensive model for the analysis of the bone and antler industry based on the various stages involved in the manufacture of bone and antler implements. This technological sequence includes "(1) acquisition of raw material, (2) core preparation, (3) core reduction-blank production, (4) blank shaping and final finishing, and (5) tool refurbishing and recycling" (Le Blanc 1984: 306). Le Blanc's model will be used to study the osseous industry at MlVm-4. This approach will help to reveal the processes of bone and antler manufacturing carried out at the site, and set the basis for comparisons between the assemblage at MlVm-4 and similar industries at contemporary sites in the Northern Yukon.

This chapter is divided in two sections. Part I deals with bone and antler reduction by-products, while Part II includes the description and analysis of osseous artifacts resulting from the late stages of reduction. Most of the artifacts have been categorized according to their function; all the categories used in the study follow Morlan (1973) and Le Blanc's (1984) classification.

Orientation rules are as follows: the long axis of a specimen is parallel to the observer; the terms proximal or base designate the end that is closest to the observer and the distal end or tip refer to the end that is farthest; the outer or dorsal surface faces upwards and refers to the exterior of the bone or antler piece; conversely, the inner or ventral surface faces down and designates the interior of the marrow cavity of bone or the spongiosa part of antler. The left and right are to the left and right of the examiner; the tip represents the functional end of the specimens, while the base refers to the hafting end. When those attributes cannot be determined, the wider end is considered as the base.

Part I: Core Reduction-Blank Production

Bone Production By-Products (N=11)

Cores (1)

The only core found at Dechyoo Njik is an exhausted specimen made from the distal section of a caribou 4th metatarsal (#1283: l. 100.59 mm, w. 43.79 mm, t. 23.71 mm, wt. 31.5 g; Plate 11). The core has been modified by longitudinal reduction. A medial or lateral surface groove was first used along with another groove in the posterior vascular channel to remove one border blank by splitting. Subsequently, another lateral (or medial) groove was made to detach a second blank. Apparently, this second operation was unsuccessful and the bone split beside the groove. Transverse cutting marks located on both surfaces above the distal epiphysis were probably used as determination points for the border blanks. A similar specimen was found in level 5 at the Rat Indian Creek site (Le Blanc 1984: 315, 344 Plate 52a). On this one, however, a unique blank has been detached.

By-Products of Core Reduction (3)

By-products of bone core reduction at the site all present grooving facet remnants (Plate 11). One example (#1395: l. 92.05 mm, w. 16.96 mm, t. 6.76 mm, wt. 7.8 g) is an elongated and narrow piece of shaft bone. In addition to a groove remnant on the left side of the distal end, the specimen exhibits a short longitudinal groove and a transverse cut mark on the distal end. The second fragment (#1269: l. 41.69 mm, w. 11.04 mm, t. 6.59 mm, wt. 1.6 g) is a burnt piece of bone with a groove running on the right side of the anterior surface, from the proximal to the distal end. It looks as if the bone had split beside the groove. The last example (#1563(1): l. 41.96 mm, w. 9.75 mm, t. 3.77 mm, wt. 1.1 g) is a short bone fragment with a groove remnant running all along the the left side of the anterior surface.

Unmodified Blanks (N=1)

Only one bone blank has been collected at Dechyoo Njik. The specimen (#1263/1291: l. 101.09 mm, w. 27.18 mm, t. 6.56 mm, wt. 19.2 g; Plate 11) is derived from the shaft of a large mammal bone, probably from a caribou metatarsal. It exhibits a grooving facet remnant on its left side. The entire anterior surface is covered with cutting marks. After it was extracted, the blank was burnt and broken into many pieces.

By-Products of Blank Shaping (N=6)

Six bone fragments are waste products of blank shaping. Three examples exhibit groove remnant sections. The first fragment (#1563(5): l. 17.84 mm, w. 6.98 mm, t. 3.67 mm, wt. 0.3 g) is a charred bone that exhibits a groove residue along the left edge of its posterior surface. Both edges of its anterior surface have been scraped. The next specimen (#73: l. 23.80 mm, w. 11.55 mm, t. 6.03 mm, wt. 1.0 g, Plate 11) is a small burnt fragment of bone. There is a groove section running longitudinally across its anterior surface. The object also shows evidence of scraping. Another bone fragment (#1492(b): l. 21.25 mm, w. 19.81 mm, t. 3.61 mm, wt. 1.0 g, Plate 11) has a longitudinal groove running from the proximal to the distal end on the anterior surface. There is also scraping marks on the anterior surface. The next example (#1563(2): l. 30.57 mm, w. 9.50 mm, t. 7.02 mm, wt. 1.0 g) has been worked by scraping and whittling and is also partially burnt.

In addition to these waste products, two bone flakes that have underwent modification figure among the by-products of blank shaping. The first one (#1267: l. 26.64 mm, w. 12.14 mm, t. 4.80 mm, wt. 1.1 g) has been scraped on its superior surface and it has a round and bevelled distal end. The second one (#1036: l. 26.77 mm, w. 11.74 mm, t. 2.92 mm, wt. 0.6 g) presents scraping marks on the left edge of its exterior face.

Antler Production By-Products (N=4)

By-Products of Blank Shaping

The only evidence of antler tool manufacturing at Dechyoo Njik is represented by waste products of blank shaping. Four fragments were found (Plate 11). All of them exhibit groove remnants or remnant sections on both lateral surfaces, thus indicating the use of a longitudinal reduction technique for blank production. The first example (#1202: l. 84.85 mm, w. 20.77 mm, t. 11.0 mm, wt. 9.3 g) has a triangular shape. It has several longitudinal, transverse and oblique cutmarks on the anterior surface. These appear to have been produced with an axe. There is also evidence of whittling on the anterior surface. The second specimen (#1280: l. 61.31 mm, w. 13.99 mm, t. 9.19 mm, wt. 5.2 g) was probably part of a larger blank that has been subsequently broken at the proximal end. The dorsal surface shows evidence of whittling and scraping and the ventral face of the distal end has been bevelled. The third fragment (#89: l. 76.10 mm, w. 11.51 mm, t. 8.40 mm, wt. 7.3 g) is an elongated piece of antler with evidence of whittling, scraping and polishing on the anterior surface. It also exhibits a transversal cutmark on the posterior surface. The last example (#135: l. 36.74 mm, w. 15.03 mm, 6.83 mm, 3.2 g) has a rectangular outline. It presents evidence of groove remnants on both lateral sides. In addition, a shallow oblique groove runs from one lateral side to the other, on the anterior surface. The proximal end has been cut and snapped.

Part II: Products of Blank Shaping and Finishing

Bone and Antler Projectile Points

This category is composed of seven complete projectile points and three point fragments. Seven of the ten specimens are made from antler, and three are shaped out of bone.

Unilaterally Barbed Bone Point (N=1)

Only one unilaterally barbed bone point figures in the assemblage. The specimen (#27: l. 92.38 mm, w. 9.75 mm, t. 5.97 mm, wt. 3.8 g; Plate 12) is complete and very well preserved. It has been carefully shaped by whittling, scraping and polishing. Two pointed barbs are present on the right margin, near the distal end. The tang of the point is conical and has a flatenned oval cross section. A similar specimen from the Klo-kut site is presented by Morlan (1973: 283, 559 Plate12c).

Unilaterally Barbed Antler Point (N=1)

The unique unilaterally barbed antler point collected at MlVm-4 (#1576: l. 81.07 mm, w. 9.59 mm, t. 5.98 mm, wt. 3.1 g; Plate 12) is heavily eroded. Two pointed barbed points are present on the left side of the specimen. These are very worn. Barb lines associated with the more distal barb are present on both surfaces. The tang is very short and sharp; it is conical and has a round cross section. Whittling is evident. A similar example was found at Rat Indian Creek (Le Blanc 1984: 320, 360 Plate 68d).

Unbarbed Bone Point (N=1)

One unbarbed bone point was collected (#1377: l. 15.43 mm, w. 11.32 mm, t. 7.77 mm, wt. 13.3 g; Plate 12). It is slightly curved and has been carefully shaped by whittling, scraping and polishing. A shallow channel has been carved on the anterior surface. It runs longitudinally from the proximal end to the base of the tang. The tang of the point is conical and has a round cross section. Comparable points were collected at the Klo-kut site (Morlan 1973: 287-288, 559 Plate 12e-f).

Unbarbed Antler Points (N=3)

This category includes three specimens. Two of them are complete projectile points and the other one is the proximal section of a point. The first specimen (#1273: l.

88.35 mm, w. 13.14 mm, t. 5.82 mm, wt. 4.7 g; Plate 12) is a very refined example with an oval cross section. It has been shaped by whittling and polishing. There is an incised X on both surfaces in the middle of the shaft. The tang is conical and has been bevel-spatulated.

The second point (#1554: l. 17.26 mm, w. 8.70 mm, t. 4.71 mm, wt. 5.3 g; Plate 13) is a long and thin specimen. The tang is conical and has an oval cross section. The specimen is slightly curved and has been whittled on all surfaces.

The last example (#87: l. 55.52 mm, w. 7.15 mm, t. 6.60 mm, wt. 2.8 g; Plate 12) is the proximal end of a conical-tanged point. It was entirely made of antler cortex and has been meticulously worked by whittling, scraping and polishing. Apparently, the fragment has been broken and then recycled, since the distal end of the broken point has been subsequently bevelled and polished. A bone specimen from Klo-kut is very similar in shape to the second point described above (Morlan 1973: 287, 559 Plate 12f).

Blunt Antler Arrowhead (N=1)

One blunt antler arrowhead (#1530: l. 58,17 mm, w. 12.30 mm, t. 10.86 mm, wt. 4.6 g; Plate 13) has been found at Dechyoo Njik. It has been shaped by whittling and polishing. The specimen had two tang elements that were probably made to fit the distal end of an arrow. The left tang of the arrowhead has been broken at the base. The distal tip of the point is composed of four lobes that were made by cutting two perpendicular notches in the head of the point. The lobes show evidence of polishing. Similar examples collected at the Klo-kut site are described by Morlan (1973: 295-296) and one of them is also illustrated (ibid.: 227, 559 Plate 12g). Blunt arrowheads were used to hunt muskrats or small game (Osgood 1970: 83; Balicki 1963: 18, Leechman 1954: 20). Osgood (1970: 83) mentions that they were also shot at groose and ptarmigan. During the Historic Period, blunt arrowheads were made by "cutting off the necks of empty cartridge cases and inserting wooden shafts" (Morlan 1972a: 15).

Possible Bone and Antler Arrowhead Fragment (N=3)

Three fragments have been recognized as possible arrowhead sections (Plate 13). The first one (#1369: l. 17.87 mm, w. 6.61 mm, t. 4.27 mm, wt. 0.4 g) is made of antler and has been identified as the possible distal section of an arrowhead. The specimen is rectangular and has an oval cross section. The anterior surface as well as both lateral surfaces have been whittled and polished. Another fragment (#1563(4): l. 25.96 mm, w. 6.42 mm, t. 4.61 mm, wt. 0.6 g) is made of bone and is burnt. It has an oval cross section and shows evidence of whittling and scraping on all surfaces. The last example (#1563(3): l. 20.67 mm, w. 7.51 mm, t. 4.10 mm, wt. 0.5 g) is a short bone fragment with an oval cross section. It has been whittled and scraped laterally and on the anterior surface.

Leister Barbs (N=1)

The single evidence of a leister prong barb point type at MlVm-4 is a blank (#1035: l. 84.90 mm, w. 11.28 mm, t. 7.11 mm, wt. 6.6 g; Plate 13). The specimen is made of antler and exhibits a groove remnant section on the left edge. The proximal end is bevel-spatulated and the distal tip has been trimmed and tapered into a rounded, dull point, which probably represents the gaff end. A similar item found at the Rat Indian Creek site is described and illustrated by Le Blanc (1984: 323-324, 368 Plate 76a). Osgood (1970: 84) mentions that leister fish spears were used to kill grayling and jackfish by fishermen who posted themselved on the bank of a stream and waited for the fish to swim by.

Bone And Antler Awls (N=10)

The term "awl" refers "to any piece of bone or antler which has been sharpened to a point with a round cross section and which lacks bevelled margins, barbs, haft elements, and other characteristics of bone and antler projectiles." (Morlan 1973: 312). At Dechyoo Njik, this category includes ten specimens (Plate 14). Five of those are complete bone and antler awls whereas the other four are represented by a possible awl and three possible awl fragments. The typology developed by Le Blanc (1984: 326) to represent the different degrees of awl shaping and finishing will be used to study the awls collected at MlVm-4. As a result of the limited size of the sample, not all categories of Le Blanc's classification are represented at the site. On the other hand, two antler awls that have underwent very little modification could not be included in any category of Le Blanc's typology; such awls were not encountered at Rat Indian Creek and, as a result, were not classified. Consequently, a new category has been created in order to represent them.

Type I(c) Awls (N=2)

Type I awls, according to Le Blanc's classification, includes specimens that have underwent very little modification. Le Blanc subdivided this class in two categories, the first class (Ia) representing bone awls made on caribou metatarsal and the second (Ib), specimens made on bone blanks other than metatarsal elements (Le Blanc 1984: 326). No antler awls showing only minor modification were found at Rat Indian Creek. However, at Dechyoo Njik, two such specimens were identified. In order to represent this type of awls in the typology, I created a third category (Ic) of type I awls, which includes antler awls that only have underwent minimal modification. The specimens from MlVm-4 both exhibit grooving facet remnants suggesting that they have been detached from a core by longitudinal grooving. The first example (#1580: l. 114.83 mm, w. 6.53 mm, t. 5.53 mm, wt. 3.3 g) has been whittled and polished only at the distal end, to create a sharp triangular tip. The very end of the tip is broken. The anterior surface is covered with a few cut marks. The distal end of the second specimen (#1492a: l. 97.33 mm, w. 7.76 mm, t. 5.68 mm, wt. 2.6 g) has been polished to create a sharp point. The tip of the awl is eroded, probably because it has been used. Similar examples are illustrated by Le Blanc (1984: 326, 372-373 Plates 80-81).

Type II Awls (N=2)

This category is represented by awls that are "extensively whittled and/or polished on the shaft, proximal to the distal tip." (Le Blanc 1984: 326). At Dechyoo Njik, two fragments have been identified as possible type II awls. The first one (#90(1): l. 26.40 mm, w. 5.20 mm, t. 4.73 mm, wt. 0.5 g) is made of antler and is broken at both ends. It has a round cross section and has been scraped on all surfaces. The second example (#1563(6): l. 26.21 mm, w. 5.88 mm, t. 3.96 mm, wt. 0.3 g) is a bone fragment with a rectangular cross section. It looks as if the proximal end of the specimen had been cut. The distal end is broken and the fragment has been partially whittled and polished.

Type III Awls (N=5)

Type III awl designates specimens that are the most completely modified (Le Blanc 1984: 326) At MlVm-4, this category is composed of five specimens of which four are made from antler and one from bone. The first antler example (#68: l. 79.09 mm, w. 4.55 mm, t. 3.73 mm, wt. 1.2 g) is slighty curved longitudinally. It has been whittled and scraped on all surfaces and the proximal end has been bevelled. The very end of the distal tip is broken. The second antler specimen (#139: l. 59.55 mm, w. 5.85 mm, t. 5.32 mm, wt. 1.4 g) has a conical outline and has been very carefully worked on all surfaces, by whittling and scraping. The tip of the distal end is broken. The bone awl (#1320: l. 102.45 mm, w. 7.49 mm, t. 6.84 mm, wt. 3.2 g) has been entirely altered by whittling and scraping. The distal end has been shaped into a sharp triangular point. A groove is present on the anterior surface of the specimen. Another example made of antler (#1302: l. 52.11 mm, w. 4.99 mm, t. 4.22 mm, wt. 0.8 g) has been identified as a possible type III awl. The object has been whittled, scraped and polished on all surfaces. It has a triangular cross section and both the proximal and distal ends are pointed. Finally, a short conical piece of antler (#90(2): l. 21.13 mm, w. 4.75 mm, t. 4.40 mm, wt. 0.3 g) has been recognized as a possible awl fragment. It has been whittled, scraped and polished on all surfaces. Both its proximal and distal ends are broken. Similar specimens from the Klo-kut and the Rat Indian Creek sites are illustrated by Morlan (1973: 556 Plate 11, 571 Plate 18) and Le Blanc (1984: 377 Plate 85).

Type IV Awls (N=1)

Type IV awls includes fragments that are identified as distal tip sections of awls (Le Blanc 1984: 326). One such specimen (#37: l. 21.59 mm, w. 5.75 mm, t. 4.68 mm, wt. 0.4 g) made from bone was recognized at MlVm-4. The tip is a sharp triangular point that has been scraped. The specimen is largely eroded.

Possible Bone and Antler Tools (N=4)

This class includes bone and antler objects that have been altered, but that could not be associated with a specific function. The first element (#1103: l. 79.82 mm, w. 16.68 mm, t. 7.83 mm, wt. 6.6 g) looks like a bone shaft fragment that has been entirely worked by whittling and scraping. It has been tapered dorso-ventrally as well as laterally. The distal end is spatulated and the proximal section is rounded. The left lateral surface of the object exhibits some marks suggesting that is has been abraded with a metal file. The second object (#1504: l. 108.67 mm, w. 10.13 mm, t. 5.57 mm, wt. 5.6 g) is an elongated and spatulate-tipped piece of antler. The specimen is slightly curved longitudinally. Its inner surface has been flatened by whittling. It has a pointed distal end shaped by trimming of the lateral margins. The next example (#1061: l. 99.93 mm, w. 10.20 mm, t. 7.28 mm, wt. 6.7 g) is a piece of antler that shows evidence of whittling and scraping. Groove remnants are apparent on the lateral surfaces. The proximal section of the object has been snapped and ground in order to create a bevelled end. The presence of parallel striations on this extremity of the specimen suggests the use of a metal file. The last specimen (#1281: l. 105.82 mm, w. 19.85 mm, t. 10.51 mm, wt. 12.6 g) is a piece of antler worn on both sides. The object has been whittled and tapered dorso-ventrally and laterally. The distal end is spatulate.

Bone and Antler Worked Fragments (N=3)

Three modified bone and antler fragments have been collected at MlVm-4. Although those have underwent modification, they cannot be considered as tools or identified as specific tool fragments. The first example (#1332: l. 18.94 mm, w. 9.93 mm, t. 2.55 mm, wt. 0.4 g) is a small bone fragment with a carving mark on the anterior surface. The second specimen (#1316: l. 20.79 mm, w. 12.06 mm, t. 6.43 mm, wt. 1.5 g) is a worked antler tine that is broken at the distal end. The proximal end has been intentionally ringed and snapped. The object shows evidence of whittling and/or scraping on all surfaces. The last fragment (#1003: l. 40.14 mm, w. 10.69 mm, t. 9.43 mm, wt. 1.9 g) is an elongated piece of antler with a triangular cross-section that has been scraped on two faces.

Conclusion

The osseous industry at Dechyoo Njik is composed of implements made from caribou bone and antler. The assemblage suggests that although there was manufacture of osseous implements at the site, the production was very limited. Only minor evidence of bone core preparation and core reduction-blank production were collected, thus suggesting that unless bone remnants have been taken away from the site, most of the bone tools had been shaped elsewhere. As for antler, no evidence of butchered antler skull, proximal sections of shed antler, or proximally cut tines that would indicate core preparation activites at the site were found. No blanks or by-products of blank production were recovered. Consequently, it is more than likely that the material used to produce antler tools was introduced to the site as blanks or finished implements.

The low production of osseous tools probably bears a direct relationship with the availability of raw material at the site. One of the Porcupine caribou herd migration routes passes through the southwestern portion of the Old Crow Flats (Jakimchuk et al.1974). Caribou usually pass in this area in the spring, sometime between mid-March and mid-May, and in late August. However, since there are almost no remains of caribou in the faunal assemblage, it is unlikely that the site was occupied during those periods (see Chapter seven). Moreover, as the shedding season starts in November and usually ends around mid-December (Kelsall 1968: 39), caribou are not in the area during the shedding period. Consequently, shed antler was probably not collected in the vinicity of the site, and raw material for the manufacture of bone and antler tools was not available during the occupations at the site. Since it had to be acquired elsewhere, it is likely that the material was partially or totally worked before being taken to Dechyoo Njik, in order to reduce transportation costs.

The technology used to manufacture bone and antler implements was simple but efficient. Longitudinal reduction, by grooving the material along the long axis before splitting it, was used in order to detach suitable blank from the bone and antler cores. Since no burins or flake wedges were collected at MlVm-4, it is likely that pièces esquillées were used in order to engrave the specimens and to split them. A similar situation was recorded at Rat Indian Creek (Le Blanc 1984: 309). It is also possible that antler was first soaked in water before being worked. This process is known to make the antler more flexible (ibid.). Once a bone or antler blank had been produced, the intended tool was shaped and finished by scraping, whittling, polishing and incision. Those activities probably involved the use of stone scrapers, modified flakes and abraders.

Most of the bone and antler implements at MlVm-4 consist in hunting weapons and awls. Apparently, both the spear and the bow and arrow were used for hunting. The morphological attributes of a few projectile points seem to be adapted to fulfill specific functions, such as fishing and bird and small mammal hunting. Finally, the great number of awls figuring in the collection suggests that sewing, whether for the production of clothes and/or birch bark implements, was an important activity at the site.

Table 11. Summary List of Bone and Antler Artifacts for the Dechyoo Njik Site

Class	Number
Antler Production By-Products	
By-Products of Blank Shaping	4
Subtotal 4	
Bone Production By-Products	
Cores 1	
By-Products of Core Reduction	3
Blanks 1	
By-Products of Blank Shaping	6
Subtotal	11
Projectile Points	
Unilaterally Barbed	2
Unbarbed	4
Blunt-headed	1
Fragments	3
Subtotal	10
Leister Barb Blanks	1
Awls	
Type I(c)	2
Type II2	
Type III	5
Type IV	1
Subtotal	10
Possible Tools	4
Worked Fragments	3
Total	43

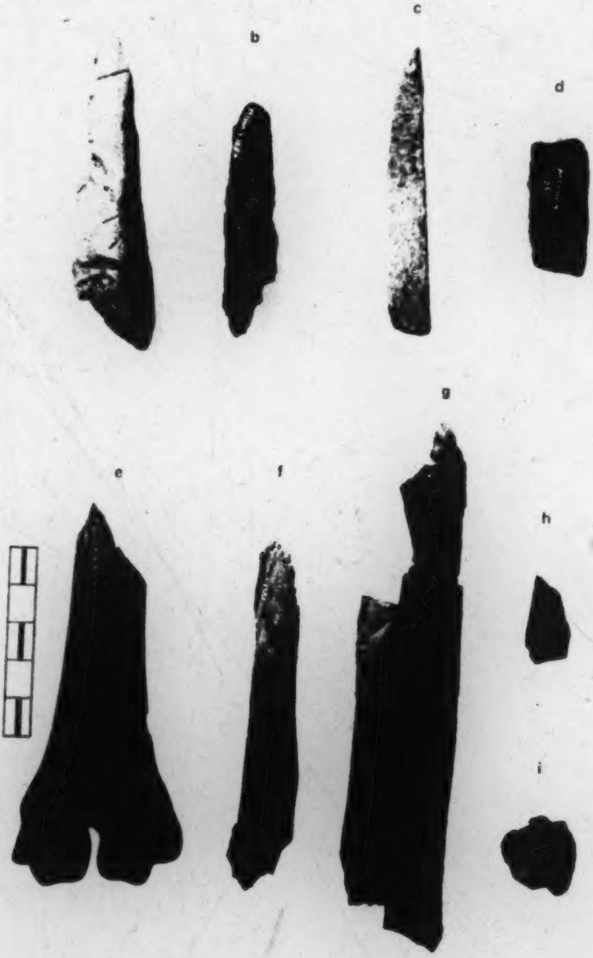


Plate 11. By-Products of Bone and Antler Reduction. (a-d) By-Products of Antler Blank Shaping. (a) 1202, Level 1; (b) 1280, Level 2; (c) 89, Level 2; (d) 135, Level 1. (e-i) By-Product of Bone Reduction. (e) 1283, Level 2, Core; (f) 1395, Level 2, Grooved Fragment; (g) 1263/91, Level 2, Unmodified Blank; (h) 73, Level 2, Grooved Fragment; (i) 1492b, Level 2, Grooved Fragment.

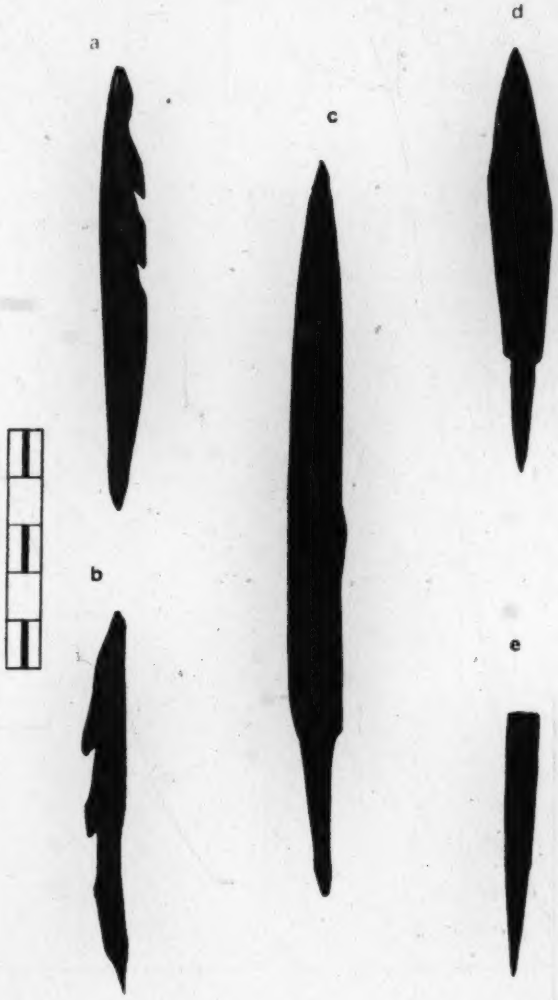


Plate 12. Bone and Antler Projectile Points. (a-b) Unilaterally Barbed. (a) 27, Level 2, Bone; (b) 1576, Level 2, Antler. (c-e) Unbarbed. (c) 1377, Level 2, Bone; (d) 1273, Level 2, Antler; (e) 87, Level 2, Antler Fragment.

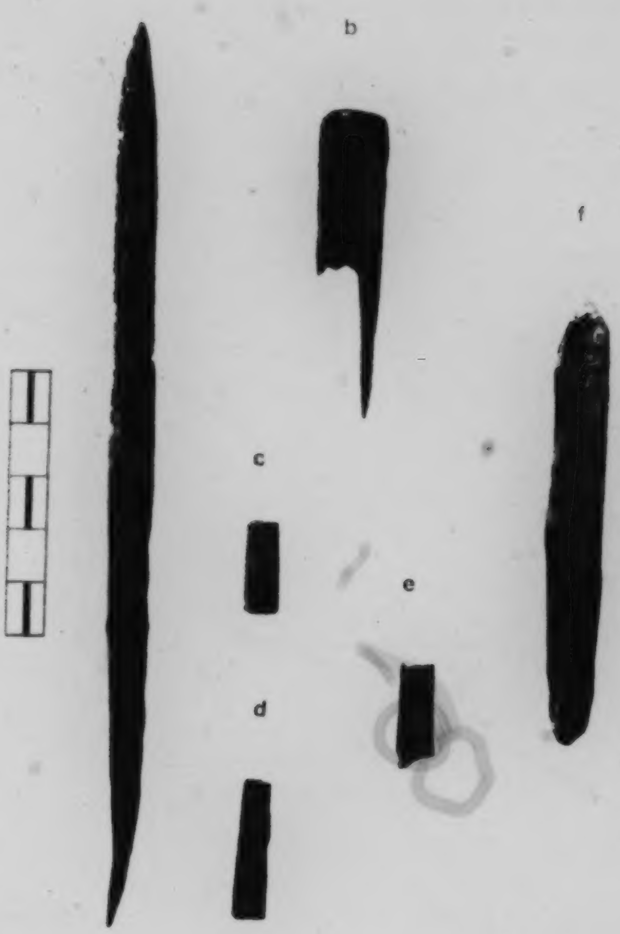


Plate 13. Bone and Antler Projectile Points. (a) 1554, Level 2, Unbarbed Antler Point; (b) 1530, Level 3, Blunt Antler Arrowhead; (c) 1369, Level 2, Bone Fragment; (d) 1563(4), Level 2, Bone Fragment (e) 1563(3), Level 2, Bone Fragment; (f) 1035, Level 2, Antler Leister Barb.

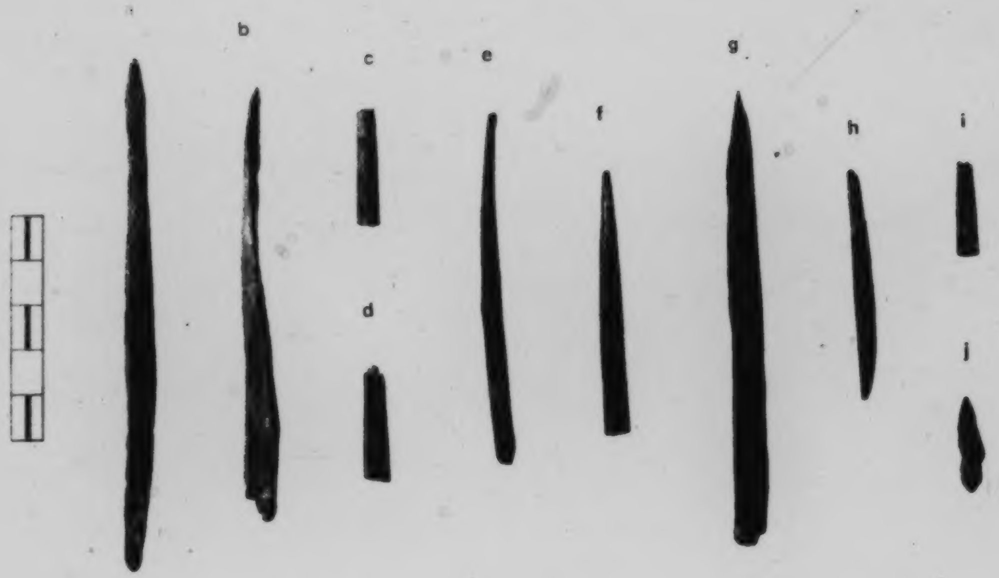


Plate 14. Bone and Antler Awls. (a-b) Type I(c) awls. (a) 1580, Level 2, Antler; (b) 1492a, Level 2, Antler. (c-d) Type II Awls. (c) 90(1), Level 2, Antler; (d) 1563(6), Level 2, Bone. (e-i) Type III Awls. (e) 68, Level 2, Antler; (f) 139, Antler; (g) 1320, Level 2, Bone; (h) 1302, Level 2, Antler; (i) 90(2), Level 2, Antler, (j) 37, Level 2, Bone, Type IV Awl.

CHAPTER 6

The Bark Industry, the Wood Remains and the Euro-Canadian goods

The Bark Industry

Evidence for a bark industry at Dechyoo Njik includes (1) a few bark fragments with stitch holes that were probably part of larger finished artifacts, (2) bark slab fragments that have been cut and represent by-products of the bark implement production, and (3) various bark rolls and fragments that may or may not be part of a manufacturing process; all are made from birch bark (Table 12). No finished bark artifacts were found. Apart from two fragments located in level 1, all bark fragments occurred in level 2. Bark remains were found in 22 (53.6%) of the 41 units excavated in 1997, over 60% was found in unit N12E7. Almost all the fragments in this unit were contained in a pit that has been identified as a multi-purpose midden. Of the fragments collected in this feature, 32 are cut slab fragments, 2 are bark rolls and the remaining are miscellaneous uncut fragments. A summary of relevant attributes for each category of birch bark artifacts is presented in Tables 13 and 14.

Table 12. Summary of Bark Artifacts

Category	Total	%
Fragments with Stitch Holes	5	1.7
Rolls	15	5.0
Cut Slabs	56	18.7
Misc. Uncut Fragments	223	74.5
Totals	299	99.9

Table 13. Summary of Metric and Non-Metric Attributes for Bark Artifact with Stitch Holes

Catalogue Number	Level	Type	Length (mm)	Width (mm)	Thickness (mm)	Number of Holes	Mean Dia. of Holes (mm)
100(1)	2	Cut Slab	78.03	27.57	2.78	8	1.65
100(2)	2	Cut Slab	37.32	23.40	3.40	3	1.35
1092	2	Cut Slab	45.21	36.30	7.61	2	3.69
1289	2	Cut Slab	41.27	31.02	0.63	1	2.26
1308	2	Cut Slab	45.06	36.69	1.92	3	1.38

Table 14. Summary of Metric and Non-Metric Attributes for Various Categories of Bark Fragments

Category	Average No. of Fragments	Average length	Average Width	Average Thickness	Average # of Cut Edges
Rolls	15	39.42	20.27	10.72	0
Cut Slabs	61	40.99	29.34	1.54	1.55
Misc. Uncut Frag.	219	28.29	14.73	0.95	0

Wood Remains

Artifacts made of wood include 82 specimens (Table 15). Of those, only 2 fragments seem to be part of intentionally shaped objects. The remaining examples include two log sections of which one has been cut on both ends, 44 wood chips with one or more cut ends or edges, and 34 miscellaneous uncut fragments. All the wood specimens but three wood chips from level 1, were found in level 2. Most in the wood artifacts were found in unit S1W11 (35.4%) and in the multi-purpose midden of unit N12E7 (31.7%). Close to 60% of the specimens collected were charred.

Of the two worked artifacts, one consists of a shaft fragment (#1084: l. 40.75 mm, w. 10.86 mm, t. 7.40 mm, wt. g), which has been whittled and is broken both distally and proximally; it is also partially charred. The second worked specimen (#1498: l. 65.38 mm, w. 16.83 mm, t. 8.57 mm, wt. g) is a flat fragment of wood that is broken on the proximal end. The distal end has been laterally bevelled to create a point. The artifact is entirely charred.

Table 15. Distribution of Wooden Artifacts

Category	Total	%	Number of Charred Fragments	%
Worked Specimens	2	2.44	2	2.44
Log Sections	2	2.44		
Wood Chips	44	53.67	17	20.73
Misc. Uncut Fragments	34	41.46	30	36.59
Totals	82	100.01	49	59.76

Euro-Canadian Artifacts

Euro-Canadian artifacts were found in all three levels and were mixed with objects pertaining to the prehistoric component of the site. The collection consists of glass beads, clay-pipe fragments and various metal objects including a metal axe, sections of nail and wire, a hand-made button and several metal fragments (Table 16) .

Glass Beads (N=78)

A collection of various glass beads was found at MlVm-4. They all are circular in shape and have a round cross section. All beads but the Cornaline d'Aleppo have been classified on the basis of their size and their color (Table 17). Seed beads are less than 3 mm in diameter, small beads mesure between 3 to 5 mm in diameter, and large beads have a diameter larger than 5 mm (Le Blanc 1984: 395). The assortment at Dechyoo Njik includes 25 seed beads, 32 small beads, 13 large beads and 8 beads identified as Cornaline d'Aleppo (Plate 15).

Discussion

The first beads to reach the Gwitchin were those of the Russian traders (Vanstone 1981: 27; Krech 1976: 217; Murray 1910: 84). Beads and other goods were first traded at various Alaskan posts and reached the Gwitchin through middlemen groups (Krech 1976: 217). In Cook Inlet, this commerce started as early as 1786, via Tanaina and other groups (Osgood 1970: 19, 1971: 83; McKennan 1965: 25).

Gwitchin people did not wait long before establishing direct commercial relationships with English traders. Apparently, their main motivation for commerce was the acquisition of glass beads. During his passage at Fort Good Hope in March 1821, Sir John Franklin observed (1828: 292): "... blue or white beads are almost the only article of European manufacture coveted by the Loucheux". Reports of the Hudson's Bay Company contain similar information concerning the Vuntut Gwitchin (HBC B.80/a/9 and HBC B.80/a/7-14, cited by Krech 1976: 217):

> By 1830, there was a marked dependence on the furs of the Rat Indians. Beads were essential for their trade, for the Rat Indians complained when beads were small or when there were too few beads and they might not bother to visit the post if they had heard that beads were in short supply or of poor quality.

Beads were used by the Gwitchin to produce ornaments such as necklaces (Richardson 1969: 380-1) and to decorate personal clothing (Richardson 1969: 380-1, Mason 1924: 48, Murray 1910: 84-5, Petitot 1867: 532-3, Kirkby 1863: 255), but they were also accumulated as a symbol of wealth (Murray 1910: 90, Whymper 1869a: 256).

Table 16. List of Euro-Canadian Artifacts by Levels

			Levels			
Categories	**Surface**	**1**	**2**	**3**	**N***	**Totals**
Glass Beads						
Seed		3	20		2	25
Small		1	28	1	2	32
Large		3	10			13
Cornaline d'Aleppo		3	5			8
Subtotals		10	67	1	4	78
Clay Pipe Fragments	1	3	6		1	11
Gun Flint			1			1
Metal Artifacts						
Axe			1			1
Copper fragment			1		1	2
Fragments	1	1	5			7
Nail Fragment			1			1
Tin button			1			1
Wire fragment			1			1
Subtotals	1	1	9	2	1	14
Grand Totals	3	25	156	4	11	104

The information available concerning the chronology of the different bead types traded in the Yukon is very limited. Consequently, it is very difficult to use the beads in order to date archaeological sites. Osgood (1970: 128), for example, mentions that the large blue beads, which are attributed to Russian traders (Petitot 1867: 532), were one of the most important trading articles of the Han Indians. However, these beads were apparently still traded long after commercial relationships were established between Gwitchin and English traders. In 1865, Émile Petitot reported, when describing the Gwitchin outfit: "The natural complement of this elegant and comfortable costume are the wampungs or beads, etsuzi, etsoy, nakay, the most appreciated of which, among the Loucheux, are the big blue beads which come from the Russian factories..." (1867: 532-533). Consequently, the presence of large blue beads at Dechyoo Njik does not necessarily reveal the existence of prehistoric trade activities between Gwitchin groups and middlemen from other tribes and these cannot be used as a temporal marker for the occupation of the site, since they were still introduced in the Yukon after the institution of English trading posts in the region.

The only type of bead that has a diagnositc value is the Cornaline d'Aleppo (Vanstone and Townsend 1970: 96). This was among the earliest beads to be traded in North America and they were widely distributed in the first half of the nineteenth century (Woodward 1965: 19-20). Although the exact time of introduction of the Cornaline d'Aleppo cannot be determined (Vanstone and Townsend 1970: 97), it is possible to subdivide the beads according to their lining color. Woodward (1965: 19-20) notes that the dark green and brown-lined types of Cornaline d'Aleppo appeared earlier in time than the white-lined category. The archaeological evidence at Cadzow Lake (MjVi-1), a stratified historic Gwitchin camp located on the Porcupine River, corroborates Woodward's assertion (Morlan 1972a: 47). In level 3, dated to around 1850 A.D., only the brown and green-lined types are present, while in level 2, which has been dated to about 1880 A.D. (ibid.: 73), all three lining colors figure in the assemblage. Both brown and white-lined Cornaline d'Aleppo were found at Dechyoo Njik, thus indicating that although the site was possibly occupied earlier, it was most likely visited around 1880 A.D. or thereafter.

Clay Pipe Fragments (N=11)

Eleven fragments of clay pipes were found at Dechyoo Njik. The first specimen (#88/1108; Plate 15) is a large pipe fragment including the distal portion of the stem and about half of the pipe bowl. Another example (#1259) represents the proximal section of a pipe stem with the rim. None of the two pipe stem fragments described above present any inscription indicating the provenance of the pipes. All the other clay pipe fragments represent side segments of the pipe bowl. Two of those also include part of the rim section. Clay pipes were manufactured in England since the beginning of the Sixteeenth century and were probably available to Yukon Natives since the first half of the nineteeth century, when the first English trading posts were established in the region.

Table 17. Summary of Metrical Observations for the Various Classes of Glass Beads

Bead Types	N	Diameter (mm) x	s	r	Length (mm) x	s	r
Seed Beads							
White, opaque	16	2.63	0.2	2.34-2.98	1.83	0.2	1.53-2.25
Turquoise, opaque	8	1.97	0.2	1.62-2.86	1.43	0.4	1.02-2.66
Pink, opaque	1	2.63			1.83		
Small Beads							
Dark blue, opaque	1	3.90			2.88		
Pale blue, opaque	1	4.44			3.33		
Turquoise, opaque	7	4.00	0.5	3.34-4.81	3.02	0.6	2.06-3.89
White, opaque	21	3.37	0.2	3.01-4.17	2.41	0.3	1.84-3.38
White, opaque (fragment)	2				3.75	0.4	3.33-4.17
Large Beads							
Navy blue, opaque	1	11.49			10.52		
Dark blue, translucent	1	10.94			9.75		
Dark blue, opaque	3	6.72	0.4	6.15-7.19	5.15	0.2	4.83-5.39
Turquoise, opaque	1	6.62			5.66		
Turquoise, opaque (fragment)	1				6.51		
Black, opaque	1	5.80			4.20		
White, opaque	5	5.71	0.4	5.12-6.46	4.01	0.4	3.48-4.71
Cornaline d'Aleppo							
Red, brown-lined	6	5.83	0.8	4.06-6.64	5.07	0.7	3.39-6.11
Red, white-lined	1	5.54			4.27		
Red, white-lined (fragment)	1	4.95			4.06		
Totals	78						

Gun Flint (N=1)

A gun flint (#1261: l. 19.47, w. 19.10, t. 10.00, wt. 3.8 g; Plate 15) was collected at the site. It is made from a grey-brown material. The specimen looks like the British prismatic gun flints that were produced during the nineteeth century (Whitthoft 1967, Woodward 1960). Its size and shape suggest that it was used with a small carbine (Woodward 1960: 33).

Metal Artifacts (N=13)

Several metal artifacts and metal fragments figure in the collection of MlVm-4. The presence of a hand-made button and of several metal fragments indicates that people were probably recycling metal containers, such as five-gallon gas cans, by cutting and working them to shape various implements. This was a common practice and evidence of metal recycling was found at several sites in the Old Crow area (Le Blanc 1984: 395-6, Morlan 1973: 367-369, 1972a: 14, 1972b: 16-7).

Metal Axe (N=1)

A metal axe (#1349: l. 84.74 mm, w. 140.86 mm, t. 33.27 mm, wt. 650.0 g; Plate 15) was found in level 2. The bit end of the specimen is worn and the pole end is mushroomed, indicating that it was used as a pounding tool. A fragment of the wooden handle is still present in the handle socket.

Nail Fragment (N=1)

A section of a nail (#1287: l. 61.76 mm, d. 4.28 mm, wt. 4.0 g) was found. The head is missing and the specimen is very corroded. Consequently, it is not possible to identify the type of nail.

Wire Section (N=1)

A section of a wire (# 1301: l. 142.75, d. 4.11 mm, wt. 10.4 g) has been curved at two different points. In addition, one end of the wire section has been hammered in order to flatten it.

Hand-Made Button (N=1)

A hand-made button (#121, l. 19.81, w. 16.75 mm, t. 1.18 mm, wt. 1.2 g; Plate 15) was cut from a flat piece of metal. The shape of the specimen is roughly rectangular two holes were pierced or drilled in the center. The inscription "DON" and the letter "O" are stamped on the button. These were probably part of a larger inscription that was on the metal container before it was recycled. However, the exact origin of the inscriptions could not be determined. The button shows evidence of red paint on both faces.

Metal Fragments (N=7)

Seven metal sheet fragments were collected. All of them are probably waste products resulting from the recycling of metal containers. The larger specimen (#81: l. 89.07 mm, w. 67.11 mm, t. 1.49 mm, wt. 15.2 g) is roughly rectangular in shape and has been cut on three sides. The second fragment (#1319, l. 41.03 mm, w. 29.89 mm, t. 2.93 mm, wt. 9.4 g) is triangular in shape; it is heavily corroded. The third specimen (#1249: l. 20.68 mm, w.16.79 mm, t. 3.42 mm, wt. 2.9 g) is a small fragment roughly rectangular in shape and heavily corroded. The next fragment (#1023: l. 20.05, w. 9.66, t. 2.84, wt. 1.0 g) is a small rectangular that is entirely rusted. Another fragment (#1260: l. 48.64 mm, w. 12.87 mm, t. 2.05, wt. 2.4 g), also cut; it has a rectangular shape. The sixth specimen (#1254: l. 41.53 mm, w. 15.54 mm, t. 1.09 mm, wt. 2.1 g) is an elongated section cut out from a metal sheet. The distal end is pointed. The last metal fragment (#116, l. 14.90 mm, w. 12.71 mm, t. 1.30 mm, wt. 0.5 g) has a rectangular outline. It presents evidence of cutting on all edges. Both surfaces of the fragment are painted in red.

Copper Fragments (N=2)

Two copper fragments figure in the assemblage. One (# 1187: l. 22.32 mm, w. 9.87 mm, t. 2.59 mm, wt. 3.2 g) is an elongated flat piece that has been laterally bevelled. The second specimen (#1296: l. 31.53 mm, w. 18.73, t. 1.42, wt. 3.1 g) is a copper sheet fragment. The left lateral section of the fragment has been rolled back over the anterior surface.

Summary

In spite of the fact that no finished artifacts were encountered, there is evidence for a bark industry at Dechyoo Njik. The only identified species of bark in the assemblage is that of birch, which is a resource available near the site. Although little can be said concerning the processes of birch bark implement manufacturing, the analysis of the fragments suggests that cutting, folding and hole stitching were part of the techniques involved. As for the types of implements that were produced, there is a great number of possibilities. Birch bark was used as primary material for the production of different types of vessels and cooking ustensils (Charlie Peter Charlie: 10/07/1999; Mary Kassi: 02/08/1998; Osgood 1970: 16; Mason 1924: 23; Murray 1910: 32; Hodges 1910: 883; Dall

1890: 201). This material was also employed for the construction of canoes (Osgood 1970: 16; Leechman 1954: 15). Apparently, birch bark was sometimes a component of structural elements: Charlie Peter Charlie mentioned that it was used to cover the fish caches (10/07/1998) and according to Osgood, it was employed to built the roof of the habitations when skins were not available (1970: 50). A last possibility mentioned by Osgood is the production of birch bark craddle-chairs, used to carry the infants (1970: 44).

The wood industry at Dechooy Njik does not provide a great deal of information concerning the use that was made of this material at the site. Only fragments, of which some are cut, and two artifacts without a definite function were found. However, it is likely that wood was mainly used in the construction of structural elements, such as habitations, racks, caches, etc. It was also probably part of composite implements, such as axes, bows, etc.

Finally, the range of Euro-Canadian artifacts found at the site is fairly limited. Glass beads is the most numerous category. The metal artifacts reveal that recycling and reshaping were common practices. The gun flint indicates the use of firearms at the site. The presence of white-lined Cornaline d'Aleppo beads in the occupation suggests that the site, although possibly occupied earlier, was most likely visited around 1880 A.D. or thereafter.

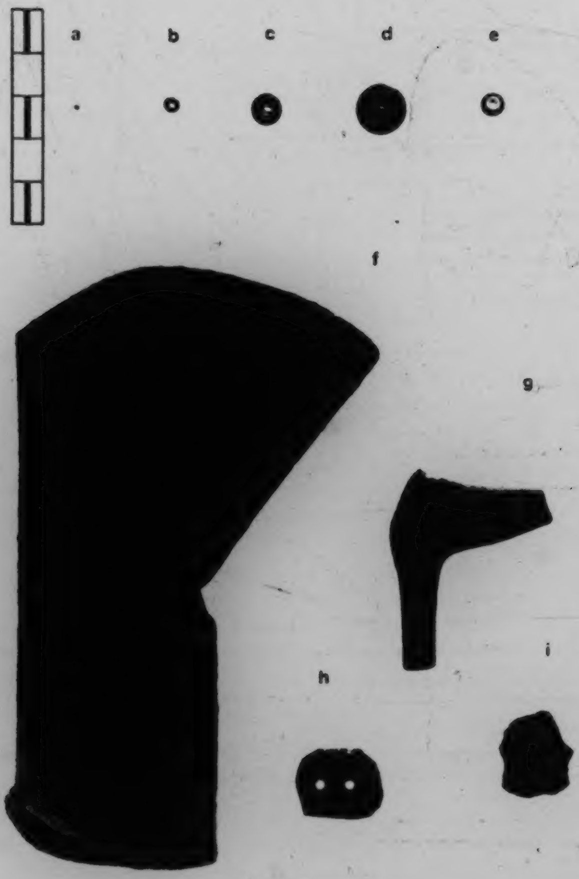


Plate 15. Euro-Canadian Goods. Beads (a-p). (a) 1198, Level 1; (b) 83, Level 1; (c) 84, Level 1, (d) 1303, Level 2; (f) 1405, Level 2; (g) 1482, Level 2; (h) 1173, Level 2; (i) 1030, Level 2 (j) 1167, Level 2; (k) 1189, Level 2; (l) 1256, Level 2; (m) 38, Level 1; (n) 43, Level 2); (o) 1225, Level 1; (p) 1352, Level 2; (q) 88, Surface, Clay Pipe Fragment; (r) 1349, Level 2, Metal Axe; (s) 121, Level 2, Tin Button; (t) 1261, Level 2, Gun Flint.

CHAPTER 7

Faunal Remains

Introduction

There were 3 886 bones recovered at Dechyoo Njik. Of these, 321 (8.2% of the total assemblage) are from the 1983 test, 706 (18.2%) come from the 1985 test operation, and 2859 bones (73.6%) were collected during the 1997 excavation. The present analysis includes all three samples; since bone and antler tools are studied as an individual category in Chapter six, they are not included here.

Methods

Faunal remains were recorded by each level of unit excavation. However, as there is no cultural stratigraphy at the site and no way to distinguish between the occupations, the bone collection is studied as a whole. The identifications of the bird and mammal bones were made using the zooarchaeological reference collection at the Department of Anthropology, University of Alberta. Fish bones were identified using both the zooarchaeological collection of the University of Alberta and that of the Provincial Museum of Alberta. I also want to thank Mrs. Shirley Harpham, the zooarchaeology technician of the University of Alberta, for her useful advices during the identification and analysis of the faunal remains. Due to the lack of comparative material, no attempt was made to identify and quantify the fish scales recovered at the site . Approximate age was determined only for mammal bones, using fusion of the long bone epiphysis. The general condition of the bones was good, with very little evidence of surface erosion, dessication cracking or root etching.

Quantitative Analysis

Table 18 represents the numbers and percentages of bones identified for each of the animal classes present at the site. Mammal bones are the most numerous, followed by fish and bird bones.

Table 18. Summary of the Faunal Assemblage by Classes

Class	Number of Bones	%	Number of Complete Bones	%
Birds	765	19.67	109	14.25
Fish	1165	29.98	269	23.09
Mammals	1693	43.57	143	8.47
Unidentifed	263	6.77	6	2.28
Totals	3886	99.99	527	13.56

Table 19 presents the results of the quantitative analysis. The number of identified specimens (NISP) and the minimum number of individuals (MNI) are represented for each taxon. Swan, geese and duck bones are represented together under their family names, since the bones from most of those birds are very similar and are consequently difficult to identify to species. Among the few bone specimens from this family that could be attributed to species with some degree of certainty are the remains of mallards (n=2), pintails (n=5), white-winged scoters (n=1), shovelers (n=3) and snow geese (n=1).

As not all the species of the *Coregonidae* family were available in the zooarchaeological collections, the bones from those specimens are grouped together under their family name. The members of this family that are likely to be present in the local area of the site include the inconnu, the humpback whitefish, the broad whitefish, and the round whitefish.

The various animals represented in the assemblage match very well the range of resources that could be expected to occur in the environment of the site. Birds of the *Anatidae* family, muskrats and fish from the *Coregonidae* family are the three dominant taxa of the collection. The Old Crow Flats area is the most important breeding location in the Yukon Territory for waterfowl species (Stevens W.E., cited in Balikci 1961: 13). It also provides the best living conditions for muskrats, which are found by thousands in the area (Leechman 1954: 1). Finally, the two creeks that meet at the site, as most creeks on the Flats, abound in fish travelling between the Old Crow River and their spawning grounds, in the upper reaches of the tributaries of the Old Crow River (Charlie Peter Charlie: 10/07/1998).

The absence of loons at Dechyoo Njik is very surprising, since they are known to have been hunted by the Vuntut Gwitchin (Balikci 1963: 13). According to Irving (1960), three species of loons are found on the lakes and rivers of the Old Crow area during the summer time: they are the common loon *(Gavia immer)*, the arctic loon *(Gavia arctica pacifica)* and the red-throated loon *(Gavia stellata)*. For his part, Osgood states that only two species of loons stop in the area in the spring and in the fall, during their annual migration (1970: 28). Thus, perhaps there are variations in the migration patterns of loons from year to year and they were not available during the occupations at Dechyoo Njik.

Discussion

Although the quantitative analysis indicates that mammal bones are the more numerous and that birds have the highest MNI, in fact, these results may not be representative of the total number of bones orginially deposited at the site. For several reasons, it is thought that fish bones are underepresented in the assemblage. Since fish bones are more delicate than mammal or bird bones, they tend to disappear faster (Wheeler and Jones 1989). Cooking practices, such as roasting and stewing, accelerate the decomposition of fish bones (Wheeler and Jones 1989). Due to their size, fish bones are often ingested by humans or dogs (Jones 1984). They are also more vulnerable to trampling and to natural processes such as root etching, abrasion, soil acidity, seasonal fluctuations in temperature and humidity and frost action (Lyman 1994; Wheeler and Jones 1989). Fish processing could also be a reason for the low frequency of bones collected at the site. If fish were dried, perhaps the skeletons were returned to the water or were used as dog food. It is also possible that the backbone was left attached to the meat for drying, and that the fish was later taken away from the site. Finally, excavation procedures could also account for the low representation of fish at Dechyoo Njik. Since it was not possible to sieve all the sediment excavated during the investigations at Dechyoo Njik, it is likely that a significant amount of small fish bone fragments were missed during the hand-excavation. Thus, it is very probable that there has been an enormous loss of fish remains at the site and that these are underepresented in comparison with mammal and bird bones. Apparently this research problem is not uncommon, since a low frequency of fish bones was also recorded at an historic fishing camp (NbVk-1) located in the northeastern portion of the Old Crow Flats area (Morlan 1972b).

Table 19. Summary of the Faunal Assemblage by Taxa

Taxon	NISP	%NISP	MNI	%MNI
BIRDS				
Anatidae	343	31.37	27	36.49
Ptarmigan	3	0.27	1	1.35
Subtotals	346	31.64	28	37.84
FISHES				
Burbot	46	4.21	3	4.05
Coregonidae	181	16.56	13	17.58
Northern Pike	23	2.10	1	1.35
Sucker	35	3.20	2	2.70
Yellow Walleye	2	0.18	1	1.35
Subtotals	287	26.25	20	27.03
MAMMALS				
Beaver	28	2.56	2	2.70
Caribou	29	2.65	1	1.35
Marten	3	0.27	1	1.35
Moose	7	0.64	1	1.35
Muskrat	373	34.13	18	24.32
Red Fox	1	0.09	1	1.35
Snowhoe Hare	19	1.74	2	2.70
Subtotals	460	42.08	26	35.12
Total Identifiable	1093	99.97	74	99.99
Unidentifiable				
Bird	419			
Fish	878			
Mammal	1233			
Unidentifiable Class	263			
Subtotal	2793			
Grand Totals	3886			

Table 20. Bones Used in the Determination of the Composite MNI

		Adult		Immature		Indeterminate	
Taxon	**N**	**Description***	**N**	**Description**	**N**	**Description**	**Total**
BIRDS							
Anatidae					27	R HUM (2 Co; 25 Px)	27
Willow Ptarmigan					1	R HUM (Ds)	1
Subtotals					28		28
FISH							
Burbot					3	R QUAD (Co)	3
Coregonidae					13	L OPER (Co)	13
Northern Pike					1	L DENT (Fr)	1
Sucker					2	R PREO (Co)	1
Yellow Walleye					1	L EPHY (Fr)	1
Subtotals					20		20
MAMMALS							
Beaver	2	R MAND (Co)					2
Caribou					1	R INN (Fr)	1
Marten	1	R RAD (Co)					1
Moose					1	R CUN (Co)	1
Muskrat	4	L FEM (Px)	11	L FEM (9 Co; 2 PX)	3	L FEM (1 Co; 2 Px)	18
Red Fox	1	L MAX (Fr)					1
Snowshoe hare	1	R TIB (Ds)	1	R TIB (Ds)			2
Subtotals	9		12		5		26
Grand Totals	9		12		53		74

*R=right; L=left; COR=coracoid; CUN=cuneiform; DENT=dentary; EPHY=epihyal; FEM=femur; HUM=humerus; INN=innominate; MAND=mandible; MAX=maxilla; OPER=opercule; QUAD=quadrate; RAD=radius; RIB=rib; SCAP=scapula; TIB=tibia. Co=complete; Ds=distal; Fr=fragment; Px=proximal

Seasonality

Although it is impossible to determine with certainty the seasonality of each occupation at the site, the bone assemblage contains sufficient information to provide a general idea about the time of the year the site was visited.

The presence of a significant number of migratory waterfowl indicates a spring to fall period for their capture. Most of the waterfowl species arrive in the Old Crow area in May (Irving 1960: 292; Dall 1870: 200) and return south during the months of August and September (Irving 1960: 313). The fact that a few willow ptarmigan bones figure in the collection is a little surprising. These birds usually leave the area at the beginning of April (Irving 1960: 188) and spend the summer above the tree line; they were traditionally hunted in winter (Balikci 1963: 18; Leechman 1954: 10). However, in 1958 their presence was reported on the Flats by the end of April (Irving 1960: 188), thus suggesting some variability in their distribution.

Fishing at the site was only possible from May through September. This is so because Schaeffer Creek is frozen from top to bottom and is devoid of fish from October until May (Steingenberger et al. 1974: 9; Steingenberger et al. 1975). Since Dechyoo Njik is smaller than Schaeffer Creek, it is assumed that it is also completely frozen during that period. According to Elder Charlie Peter Charlie (10/07/1998), the upstream migration of the fish starts in May and the fish move back to the Old Crow River from August until freeze-up. The most intensive fishing was carried on during this last period although Mr. Charlie also believes that people probably fished and resided at the site all summer.

Muskrats are available all year round on the Flats. However, traditionally muskrat hunting started in the spring before break-up (Big Joe Kay, cited in Balikci 1963: 29). Although no data are available for the Old Crow Flats, in the Mackenzie Delta, muskratting lasted "*until the leaves started to appear on the bushes, because by that time the dzan* [muskrats] *were already pregnant*." (Gwich'in Renewable Resource Board 1997: 83). In historic times, muskratting was going on from March until June 15, the date set up by the government as the closing time (Peter Tizya, 04/08/1998; Anglican Church 1987: 2; Balikci 1963: 41). Although it is impossible to establish with certainty that the specimens collected at MlVm-4 were all killed during the period mentioned above, the faunal data seem to agree with the ethnographic information.

Muskrats in the Yukon do not become sexually mature before they are a year old (Banfield 1974: 199). Although the exact age for the fusion of the epiphysis of the long bones is unknown, the process is not completed before sexual maturity is achieved. At Dechyoo Njik, there is a high percentage (61.1%) of sub-adult[2] muskrats in the collection. These specimens were probably the result of a litter from the previous summer. They could have been captured during the, summer, fall, winter or spring of the year following their birth. However, the absence of fetal or very young specimens in the collection seems to indicate that hunting was not carried out at the site during the summer, fall or early winter time. Thus, it is likely that, as indicated by the ethnographic information, the muskrats from the faunal assemblage were caught somewhere between March and June.

---

[2] In this context, the term "sub-adult" refers to individuals with the epiphysis of the long bones still unfused.

The nearly total absence of caribou remains at Dechyoo Njik suggests that the site was not occupied during the early spring and fall caribou migration, when the animals pass in the area of the site. Although small herd segments may also occasionally winter in the Old Crow Flats, caribou is usually not available in the area apart from during the two annual migration episodes (Jakimchuk et al. 1974). The time of the caribou spring migration may vary from mid-March to mid-May, and the fall migration usually takes place in late August. Thus, Dechyoo Njik was probably not occupied during these periods, since it is almost certain that people would have taken advantage of their presence. Caribou was not only the preferred food of the Vuntut Gwitchin, but it also was a great source of raw material (e.g., antler, bone, hides and sinew) for the production of numerous items.

In conclusion, from the presence of waterfowl, fish and sub-adult muskrats in the collection and the absence of caribou, it is likely that all the occupations at the site took place sometime between late spring and mid-August. All the other mammal species identified in the collection fit into this time range and moose, snowshoe hare, marten and beaver are available on the Flats throughout the year, although the last two species are not numerous in the area (Bryan 1957: 6-7).

Bone Alterations

Although the bones from the collection are generally well preserved, the faunal remains exhibit a high level of fragmentation (Table 21). The intensive breakage of the mammal bones could be explained by the fact that most of the identified bones and probably a great proportion of those that could not be attributed to species are those of small mammals. As a result of their low density, small mammal bones are more susceptible to breakage than are large mammal bones (Lyman 1994). The same is true of bird bones (ibid.). The absence of sedimentation could also account for the high level of fragmentation of the faunal assemblage at Dechyoo Njik. Without this natural protection, the faunal material produced during an occupation could have been highly exposed to trampling and breakage when the site was later revisited.

No carnivore or rodent damage was observed on any of the bones recovered. A very large percentage of bones was charred. The proportion of burnt mammal bones is particularly elevated, and cooking practices cannot account entirely for this unusual percentage. Since the camp is thought to have been used primarily as a fishing location, it is more than likely that many fires were lit in order to smoke the fish. These features might also have been used as a way to dispose of the bones. Only two charred fish bones were collected. This is probably so because fish bones were totally destroyed by the fire.

Very few cut marks have been identified on the faunal remains of the collection. This could mean that the butchering techniques were such as to avoid contact with the bones. The low frequency of cut marks could also reflect a problem of recognition during the analysis.

Table 21. Summary of Bone Alterations

Class	Charred	%	Cut marks	%
Birds	231	30.20	8	1.05
Fish	2	0.17		
Mammals	1025	60.54	21	0.90
Unidentified	97	36.88		
Totals	1355	34.87	29	0.75

Bone Frequencies

In order to learn about butchering and transport processes related to birds, fish and muskrats, the bone frequencies of these animals have been analyzed. Tables 22 through 24 present bone frequencies for the three faunal classes. The NISP of each skeletal element has been used to determine whether or not all body parts were present at the site. Although, the NISP does not take differential bone fragmentation into account, it does provide sufficient information to allow general observations.

Migratory waterfowl species were the major birds eaten by the Vuntut Gwitchin , apart from ptarmigan and grouse, which are winter residents, and a very few other species (Osgood 1970: 132). Thus, since it is very probable that most of the bird bones that have not been identified to species pertain to waterfowl, table 22 comprises all the bones of the identified specimens (n=346) plus the identified bones of the unidentified birds (n=54). The laters have been included in order to prevent the introduction of a bias in the bone frequencies, resulting from the greater difficulty of attributing some specific bones to species.

Birds could be hunted anywere on the Flats, while they were flying or sitting on the water or ground. Table 22 shows that although elements from all body parts figure in the collection, few axial elements are present in comparison with bones from the appendicular skeleton. Differential fragmentation is probably largely responsible for this phenomenon, since the limb bones are usually fragmented in two to three pieces (Howard 1929). There are also very few vertabrae in the collection, perharps because they are less resistant to taphonomic processes and totally desintegrated. They could also have been missed during the excavation because of their size.

For the same reason as the bird bones, the frequency table for the fish also includes all the bones identified to species (n=287) plus the identified bones that could not be attributed to a particular species (n=282). Most fish were probably taken at the site itself, since the location is ideal for fishing. Table 23 shows that there is an enormous difference between the numbers of fish bones from the crania and those from the axial skeleton. Head bones are much more numerous than axial bones, a fact that is very surprising if we consider that vertabrae have a much greater density than all other fish bones (Butler 1990). As a consequence, they should preserve better and be found in larger quantities within archaeological deposits. At Dechyoo Njik, the total MNI for the fish is 20. As a rule, fish from the *Salmoniformes* order which includes the *Esocidae* (pike) and the *Coregonidae* (whitefish) families, count between 50 and 60 vertebrae (Wheeler and Jones 1989: 108). This means that the number of vertebrae (N=69) at the site only accounts for 10% (2 individuals) of the total MNI.

This discrepancy could be the consequence of fish processing and transportation. Osgood (1970: 29) mentions that the Peel River and the Vuntut Gwitchin prepare the fish in the same way: they "first cut the heads, then deftly slice down each side of the back, removing the backbone, an operation which leaves the meat of the fish in a single flat piece. The fleshy surface is cut into squares to expose more of it to the sun when it is hung up to dry." However, Osgood (1970: 37) also reports that among the Vuntut Gwithcin, the head and backbone of small fish are left attached to to the meat. Balikci (1963: 84) mentions that in 1961 in Old Crow, fish were "split in two, cleaned, their heads cut off and then hung on horizontal sticks." This is also the technique described by Elder Mary Kassi (04/08/1998). Apparently, sometimes the fish were not cut at all, but were just bundled on branches by the head, and hung up to dry (Charlie Peter Charlie, July 10 1998; Gwich'in Renewable Resource Board 1997, 149). Thus, it is very probable that a great quantity of fish was smoked at the site and that in some cases the backbone was not removed. Once dried or smoked, the fish was probably carried away. Dried fish is a very light and transportable resource and it can be moved over long distances (O'Leary 1996, 21). This would explain why fish vertebrae are so sparse at the site. However, the ribs should be present in larger quantities since in most cases, they were removed from the meat before it was dried. Perhaps because they are so fine and fragile, the ribs were destroyed or too fragmentary to be recovered during the excavation.

Although all muskrat body parts figure in the assemblage, foot bones are underepresented. Since those bones are very small and consequently, more fragile than most other muskrat bones, it is likely that their low frequency is the result of differential preservation and excavation techniques.

Table 22. Bird Element Summary

Category	NISP	%NISP
Axial Skeleton		
Cranium	14	3.49
Mandible	13	3.24
Rib	7	1.75
Vertebra	20	4.99
Subtotals	54	13.47
Appendicular Skeleton		
Carpometacarpus	12	2.99
Coracoid	55	13.72
Femur	30	7.48
Furculum	19	4.74
Humerus	77	19.20
Metacarpal	3	0.75
Metatarsal	3	0.75
Pelvis	1	0.25
Phalanx	14	3.49
Radius	6	1.50
Scapula	21	5.24
Sternum	28	6.98
Tarsometatarsus	11	2.74
Tibiotarsus	28	6.98
Tibia	33	8.23
Ulna	6	1.50
Subtotals	347	86.54
Grand Totals	401	100.01

Table 23. Fish Element Summary

Category	NISP	%NISP
Head Skeleton		
Angular	18	3.16
Basioccipital	1	0.18
Basipterygium	28	4.92
Branchiostegal Ray	50	8.79
Ceratohyal	9	1.58
Cleithrum	36	6.33
Coracoid	2	0.35
Dentary	9	1.58
Dethmoid	1	0.18
Entopterygoid	1	0.18
Epihyal	3	0.53
Frontal	20	3.51
Hyomandibular	34	5.98
Interopercle	25	4.39
Maxilla	6	1.05
Metapterygoid	4	0.70
Opercle	59	10.37
Orbitosphenoid	1	0.18
Palatine	3	0.53
Parasphenoid	10	1.76
Pharyngeal	3	0.53
Posttemporal	8	1.41
Premaxilla	1	0.18
Preopercle	39	6.85
Quadrate	16	2.81
Scapula	1	0.18
Subopercle	41	7.21
Supracleithrum	2	0.35
Urohyal	3	0.53
Vomer	2	0.35
Subtotals	436	76.65
Axial Skeleton		
Rib	64	11.25
Vertabra	69	12.13
Subtotals	133	23.38
Grand Totals	569	100.03

Table 24. Muskrat Element Summary

Category	NISP	%NISP
Axial Skeleton		
Cranium	23	6.16
Mandible	39	10.46
Rib	8	2.14
Tooth	44	11.80
Vertebra	44	11.80
Subtotals	158	42.36
Appendicular Skeleton		
Calcaneus	1	0.27
Clavicle	2	0.54
Femur	61	16.35
Humerus	42	11.26
Innominate	40	10.72
Metatarsal	4	1.07
Phalanx	9	2.41
Radius	4	1.07
Scapula	5	1.34
Sesamoid	1	0.27
Tibia	33	8.85
Ulna	13	3.49
Subtotals	215	57.64
Grand Totals	373	100.00

Spatial Distribution

Figure 11 presents the spatial distribution of the bird, the fish, the mammal and the unidentified bone classes. Bird bones are present in 84.2% of the units, fish bones in 63.2% of the units, and mammal bones in 97.4% of the units. Fish bones were found in larger concentrations than the other categories. Only one unit could be interpreted as an activity area. Unit N5E8 comprises 24.5% (N=229) of the total number of fish bones. This area is the closest to the presumed fishing location at the meeting point of the two creeks. Perhaps caught fish were cut for drying in this particular section of the site. The remaining bones are scattered throughout the site in different but insignificant proportions, and no specific activity areas can be recognized. This situation is expectable at an unstratified, multi-occupational site where there is overlapping and smearing of the activity areas from one occupation to another.

Conclusion

Dechyoo Njik appears to be a location that was used mainly for the exploitation of fish, migratory waterfowl and muskrat, although fishing is thought to have constituted the major activity at the site. On the basis of the availability of those species and caribou in the area of the site throughout the year, it was possible to establish that the occupations at the site likely occurred in summer, sometime between late spring and mid-August. Migratory birds and fish were only present on the Old Crow Flats from May through September. Although muskrats lived on the Flats all year round, the age composition of the assemblage suggests that muskratting at the site occurred between March and mid-June. Finally, the nearly total absence of caribou in the assemblage indicates that Dechyoo Njik was probably not occupied during the spring migration, which took place between mid-March and mid-May, and during the fall migration in late August.

Little could be learned about the butchering techniques relative to the animals hunted at the site. Very few cut marks were identified on the bones, and burnt bones could have been the result of subsequent occupations. Bone frequencies do not account for differential preservation and, as a result, the absence of some bones is difficult to interpret. However, it seems that a great number of fish was processed at the site, with the backbone attached to the meat. A large amount of fish was probably consumed at another location and this is why so few vertabrae were collected at the site.

Finally, since the site is not stratified and was occupied more than once, specific patterns of spatial distribution could not be recognized. All bird, fish and mammal bones seem to be scattered around the site in no apparent pattern. In one unit only is there a significant concentration of fish bones suggesting that this particular area may have been used to cut the fish and prepare it for drying.

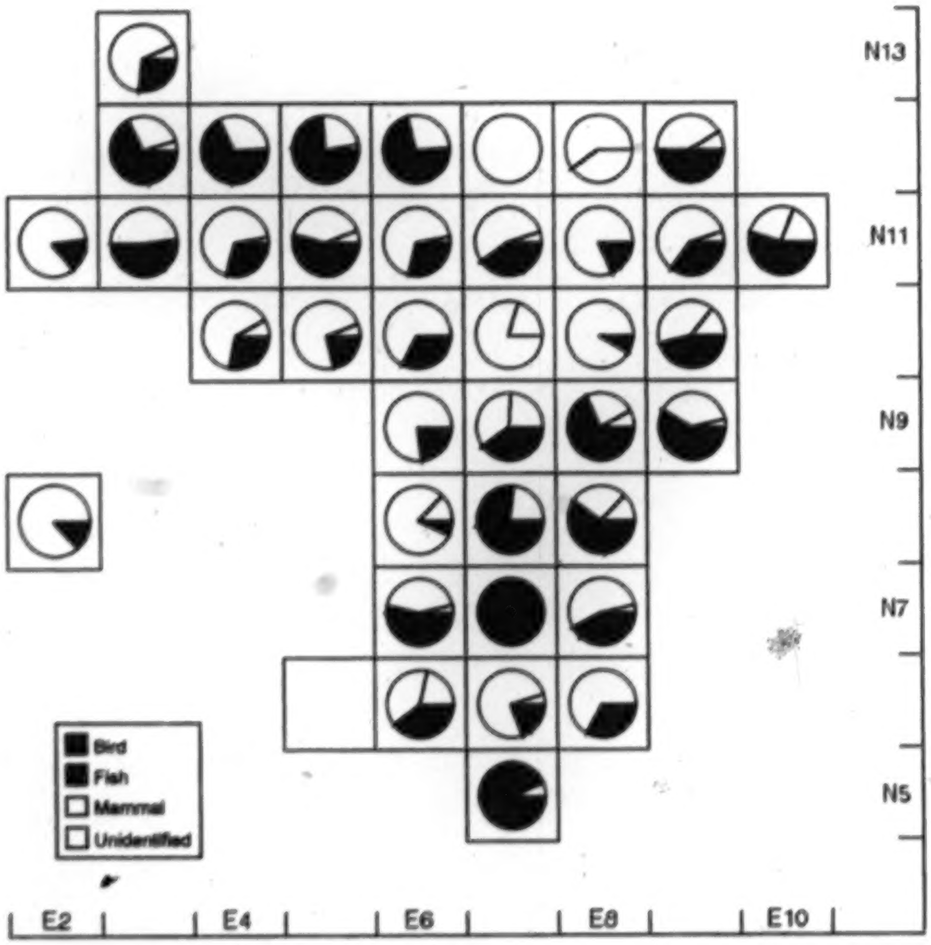


Figure 11. Density Distribution of Faunal Remains by Classes

Table 29. Number of Bones by Classes Contained in Each Unit of Excavation

Units	Bird	Fish	Mammal	Unidentified
N5E8	7	229	15	1
N6E6	0	0	0	0
N6E7	15	0	15	8
N6E8	10	3	51	3
N6E9	2	0	4	0
N7E7	25	2	21	2
N7E8	0	4	0	0
N7E9	17	3	25	2
N7E11	0	1	0	0
N8E2	2	0	13	0
N8E7	0	2	25	4
N8E8	24	15	12	0
N8E9	41	66	50	22
N9E7	3	0	10	0
N9E8	10	0	9	6
N9E9	41	137	64	19
N9E10	36	17	35	3
N10E4	21	22	98	11
N10E5	3	1	14	1
N10E6	3	0	6	0
N10E7	0	0	4	1
N10E8	4	0	43	0
N10E9	30	0	26	9
N11E2	3	8	67	1
N11E3	20	52	70	2
N11E4	8	16	58	2
N11E5	63	96	118	16
N11E6	12	0	28	1
N11E7	7	9	22	2
N11E8	7	2	39	0
N11E9	8	0	14	1
N11E10	19	0	33	25
N11E10	19	52	34	25
N12E4	20	41	25	4
N12E5	47	77	56	2
N12E6	37	17	17	2
N12E7	4	59	25	1
N12E8	0	0	2	0
N12E9	0	0	2	3
N12E10	6	0	5	1
N13E3	0	4	10	1
Totals	574	935	1165	181

CHAPTER 8

Summary, Comparisons and Conclusion

Introduction

The summary and comparisons included in this chapter will directly answer the specific questions adressed in the introduction. Although some limitations of the archaeological data (e.g., the lack of cultural stratigraphy or the fast rate of organic decomposition) restricted the amount of information that could be derived from the assemblage, the analysis and interpretation of the remains from Dechyoo Njik did provide valuable information and contribute to a better understanding of the traditional land use patterns in the southwestern area of the Old Crow Flats.

Chronology

Due to the absence of cultural stratigraphy, it is impossible to be very precise about the chronology of the site. However, the artifact sample at Dechyoo Njik revealed at least two distinct occupations. According to the artifact typology and radiocarbon dating, the initial occupation took place during the Klo-kut Phase of the Late Prehistoric Period in the Northern Yukon. The Klo-kut Phase ranged from A.D. 700 until the contact period. The second occupation occurred during the Historic Period. From the chronology of the Cornaline d'Aleppo beads, it seems that this can be after the introduction of the white-lined type, around 1880 A.D.

Function(s) and Seasonality

The analysis of the faunal remains from Dechyoo Njik revealed that the site was used for the gathering of various resources. The most numerous species encountered in the assemblage were those of fish, waterfowl and muskrat. In addition, a few remains of ptarmigan, beaver, marten, snowshoe hare, red fox, caribou and moose were collected. For several reasons, it is thought that fish remains are underepresented at the site and that fishing was more important than suggested by the quantity of fish bones recovered.

Regarding the seasonality of the occupations, it appears that some resources present at the site could have been taken at any time of the year. However, the presence of fish and migratory waterfowl, the age composition of the muskrat assemblage, as well as the absence of a significant number of caribou in the collection strongly suggest that the site was visited sometime between late spring and mid-August.

Thus, Dechyoo Njik was probably a summer fishing location where food storage activities were carried out, probably in preparation for the winter months. Muskrats and migratory waterfowl were also important resources for people at this location and contributed to their diet. Although no vegetal food remains were preserved at the site, it is more than likely that berry picking was carried out in the vicinity of the site, as well. The Old Crow Flats provides a favorable environment for the growing of wild blueberries, salmonberries, low-bush cranberries, wild strawberries and raspberries (Osgood 1970: 28).

Technological System

Since very little information is contained in the archaeological record of MlVm-4 concerning the technology used during the historic occupation of the site, the foregoing discussion will focus exclusively on the prehistoric component of the site. This period of occupation will be treated as a whole, for no information about change and continuity is available due to the absence of cultural stratigraphy.

The lithic assemblage at Dechyoo Njik revealed that although most stone materials were available regionally, but not in the immediate environment of the site. As a consequence, all lithic raw materials had to be brought to Dechyoo Njik from other locations. Two major classes raw materials were used for stone tool production. These consist in cryptocrystalline materials (mostly cherts) and coarse-grained rocks, of which the great majority is composed of quartzite. Each class of lithic material is represented by specific categories of tools. The former was dedicated to the reduction of chert pebbles for the manufacture of small flake tools. Coarse stone material were almost exclusively used to produce bifaces by working tabular slabs of material.

From the study of the cryptocrystalline cores, debitage and tools found at the site, it appears that the lithic technology was relatively simple, though efficient. Small warterworn pebbles were collected from regional sources and then reduced in order to produce flake blanks. The low frequency of cores in the collection suggests that most of the cryptocrystalline material was brought to the site as blanks or finished implements. In addition, the majority of cores found at the site were exhausted, thus revealing the intensive used made of all available raw material. The presence of two opposed crushed margins on a number of specimens indicates the use of the rest/anvil technique for flake production. For the manufacture of tools, larger flakes were selected and retouched by simple edge-shaping techniques. The dominant tool categories in the assemblage are retouched flakes, scrapers and pièces esquillées. There is also evidence, although limited, of bifacial technology. The small size of the bifacial debitage, however, strongly suggests that most of the flakes are the result of edge resharpening.

The absence of a significant amount of reduction by-products, suggests that tabular bifaces were manufactured elsewhere and then brought in to the site as blanks or finished scrapers. A few debitage products suggest that the edge of the tabular bifaces were bifacially retouched. Apparently, the other implements made from coarse-stone material, such as the celt-like object and the grinding tablets, were also produced elsewhere, since no waste products were collected at the site.

Most of the raw material used for the manufacture of osseous implements was derived from caribou bone and antler. The reduction model used for the analysis of this industry provided valuable information concerning the technological sequence of operations carried out at the site for the production of osseous implements. It demonstrated that the first three stages of production (i.e. acquisition of raw material, core preparation, core reduction/blank production) were carried out almost entirely elsewhere. The unique core and the scarce waste products of core reduction and blank shaping collected at the site indicate that suitable blanks were produced by longitudinal grooving and splitting techniques of reduction. Scraping, whittling and polishing were used to shape the various objects made from bone and antler. Incision was recorded only on one bone point, and had been used to decorate the specimen. The most frequent tools made from bone and antler at Dechyoo Njik are projectile points and awls. The presence of the latters suggests that sewing was an important activity at the site.

The lithic and osseous industries at Dechyoo Njik seem to be interrelated. It is more than likely that tools made from cryptocrystalline material supported the osseous industry and were used for the production of bone and antler implements. Flake blanks or pièces esquillées with a columnar fracture could be used in order to groove bone and antler material, while scrapers, modified flakes and abraders were probably useful to shape and finish the implements. Thus, both the lithic and osseous industries at Dechyoo Njik were functionally connected and formed a coherent technological system.

Although lithic and osseous material could be acquired relatively easily in the region, they were not readily obtainable in the immediate area of the site. As a consequence, a minimum of planning was without any doubt necessary before people visited Dechyoo Njik. They had to decide what types of tools would be needed for the activities that would be carried out at the site. Then, the appropriate raw materials had to be collected and brought to the site, or shaped into blanks or finished implements before being imported. Apparently, the two latter options were favored and the scarcity of raw material resulted in a low level of lithic and osseous tool production at the site. Transportation costs are likely to have influenced this decision. Taking blanks and finished implements to the site probably saved people from carrying larger pieces of raw material as well as the necessary tools to shape the new implements.

The presence of a bark industry at the site is attested only by the presence of various manufacturing waste products; no finished implements were found. All the bark fragments are made of birch, which is available at the site. The waste products indicate that various techniques such as rolling, cutting and hole stitching were used in order to manufacture objects.

Finally, wood remains were also recovered. Most of those are fragments, some of them showing evidence of cutting. It is likely that apart from being used as firewood, the wood chips, fragments and log sections collected at the site resulted from the construction of various structural and composite elements.

Fishing techniques

It has been demonstrated that one of the main, if not the major subsistence activities carried out at Dechyoo Njik was fishing. The confluence of two creeks -- of which one is a tributary of the Old Crow River and the other a stream leading to a lake -- is an ideal location for fishing, since thousands of fish follow this course while travelling back and forth between their wintering area and their spawning grounds. Thus, throughout the summer, fish density is probably very high at the site.

Very few fishing implements figure in the collection. The leister prong blank suggests that fish spearing was a method used at Dechyoo Njik. Unilaterally barbed harpoons were also used by some Athapaskan groups to spear fish (Morice 1910: 192-193). However, spearing is definitively not the most efficient fishing method. Lindström (1996: 129) reports that among aboriginal groups of the western Great Basin, about 10 fish per hour were taken with a fish spear during the spawning time. Consequently, the procurement costs of spearing are relatively high unless the fish are very large and, although in some circumstances it might be the only way to capture fish, it is unlikely that this was the only fishing technique used at Dechyoo Njik, especially since the site is established at a strategic location for the utilization of a mass capture technique such as the fish trap.

A few environmental variables must be present so that a fish trap can be used effectively. First, there must a great quantity of fish migrating past the fishing site (Rostlund 1952: 101). In addition, the stream must be shallow enough so that it is possible to walk across it in order to build the weir (Peter Tizya: 04/08/1998, Charlie Peter Charlie and Steven Frost: 10/07/1998, Osgood 1970: 33, Rostlund 1952: 101). Osgood (1970: 79) writes that the Peel River Gwich'in would build a trap across the river when the water was no more than two and a half to three feet deep. Similarly, Elder Peter Tizya mentioned that when the village of Old Crow was operating a fish trap on the Old Crow River, a few kilometers upriver from the village, the water was no more than two to three feet deep (04/08/1998). Also, it is better if the stream is narrow because this way, its entire width can be barred, and fish cannot escape (Peter Tizya: 04/08/1998). In the early fifties, Richardson (1969: 390) observed: "The Yukon Kutchin pass the summer in drying whitefish *(Coregonus)* for winter use. For the purpose of taking these fish, they construct weirs by planting stakes across the smaller rivers and narrow parts of lakes...". A few years later, Murray (1910: 89) noted that "The small rivers and narrow parts of the lakes are barred with stakes, and large willow baskets placed to entrap the fish, ...". Another requirement is that the water from the stream must be swift enough to drive the fish into the trap (Osgood 1970: 33), but the current must not be too strong because otherwise, it would be impossible to build the weir across the stream (Rostlund 1952, 102). Finally, a last thing to consider is that there must be wood in proximity to the fishing site, so that raw material is available to build the weir and the basket trap (Peter Tizya: 04/08/1998).

MlVm-4 combines all the necessary conditions for the use of a fish trap. When the creeks are not frozen, the fish use them both as a migration paths. The mouth of the smaller creek is narrow and the water is shallow but sufficiently swift. Finally, black spruce, birch bark and willow are plentiful around the site and can be used for the construction of the trap. Thus, the site appears to be an ideal location for fish trapping, and when Elder Charlie Peter Charlie (10/07/1998), who was interviewed at the site, was asked about how he thought people fished at this location, he was categoric about the fact that they used a fish trap.

No evidence of a fish trap was collected at the site. However, this is not really surprising, since wood is an organic material that decays at a relatively fast rate. At NbVk-1, a fishing camp located on the Old Crow Flats and occupied around 1930, the remains of two fish traps were identified (Morlan 1972b: 13). However, after only three decades, the structures were highly damaged. Several poles were found in the river; they had been flattened and submerged by the stream. The only section of a weir was represented by a pile of sticks lying on the right bank of the stream. The remains of a platform probably aimed at supporting a basket were also found on the left bank. This example demonstrates that if a fish trap was used at Dechyoo Njik, it was probably washed away slowly by the stream once abandoned. It is also likely that if some remains of the weir or the basket trap were left on the bank, they desintegrated since then.

Fish traps were often used in combination with other fishing implements. For example, fish were taken out of the trap with a dip net (Charlie Thomas: 0208/1998, Osgood 1970: 74). In 1866, Whymper (1869b: 178-179) who was descending the Yukon River from Fort Yukon, encountered many Natives engaged in fishing activities. He noted: "They [fish] are taken in weirs in shallow places, in hand-nets of circular form and by spearing." Thus, the presence of both a fish trap and fish spears would not be unusual at Dechyoo Njik and it is likely that fish trapping was the major fishing technique at this location.

Relation with the Culture-Historical Model in the Northern Yukon

The composition of the prehistoric assemblage at Dechyoo Njik is very similar to that of the Klo-kut site (Morlan 1973) and to the Klo-kut Phase (Level 5) of the Rat Indian Creek site (Le Blanc 1984). Both have been identified as caribou hunting camps and are located at traditional crossing locations of the Porcupine caribou herd, on the Porcupine River. Klo-kut was occupied during the spring, while the Late Prehistoric occupation at Rat Indian Creek took place during the winter and the spring (Kolar 1980: 23).

Beginning with the cryptocrystalline lithic tools, most of the cores found at all three sites were made from regionally available chert material, mostly collected as waterworn pebbles. Although the sample from Dechyoo Njik is very small, it seems that the cores found there are smaller than those found at Klo-kut and Rat Indian Creek. The weight of the exhausted cores and core fragments at Klo-kut is 20.12 g and 12.33 g respectively (Morlan 1973: 181, Table 17; 183, Table 18), while at Dechyoo Njik, the same objects weigh 15.30 g and 6.1 g. The average weight for all cores from level 5 at Rat Indian Creek is 23.30 g while at Dechyoo Njik, it is 10.7 g (Le Blanc 1984: 76, Figure 6). Since chert pebbles were not available at Dechyoo Njik and people had to bring them in, they might have intentionally chosen smaller pieces of raw material, or simply used them more intensively.

Table 25 presents the average measurements for all the categories of modified flakes encountered at Klo-kut, Rat Indian Creek and Dechyoo Njik. Except for a noticeable difference between the weight of the flakes from Klo-kut and those from Rat Indian Creek and Dechyoo Njik, the size of the flakes from the three sites is comparable. In all three locations, larger pieces of debitage were selected for the production of modified flakes.

The scrapers from Klo-kut, Rat Indian Creek and Dechyoo Njik are similar. Most are made on simple blank flakes that present no evidence of modification other than one or more modified edges. Table 26 presents a summary of the average metric attributes for the scrapers from the three sites. The average size of all scrapers is much the same. Apparently, the scrapers were intentionally manufactured on large flakes.

Although the sample of pièces esquillées at Dechyoo Njik is very small, bipolar flaking was obviously a reduction technique that was known and used by the people who occupied the site. Bipolar reduction has been identified at both Klo-kut and Rat Indian Creek (Le Blanc 1984, Morlan 1973).

Bifacial flaking was used at Dechyoo Njik. Over 25% of the unmodified debitage was associated with a bifacial technology and one biface fragment was also collected. However, the small size of the biface reduction flakes suggests that mainly resharpening activities were carried out at the site. At Rat Indian Creek, the debitage sample from the Klo-kut component did not contain more than 0.1% of bifacial flakes and only seven bifaces and biface fragments were found. Bifacial technology, however, was recognized as being very common in the earlier period (Le Blanc 1984: 204). Morlan states that bifacial technology was not identified at Klo-kut for the period before A.D. 600 (Morlan 1973: 403). Nevertheless, he did not study the debitage products and only considered the absence of bifacial tools for his interpretation. From these results, it appears that although bifacial technology was known during the Klo-kut Phase, there was in fact little biface production during that period.

The coarse stone industry at Dechyoo Njik is also comparable to those of Klo-kut and Rat Indian Creek. Tci-thos were common at the Dechyoo Njik and were represented by tabular bifaces implements and fragments. The complete specimens collected at MlVm-4 largely resemble some of the semi-lunear tabular bifaces from Rat Indian Creek (Le Blanc 1984: 280, Plate 30a: 281, Plate 31c).

According to some Elders, the tabular bifaces from Dechyoo Njik were too small to be used to scrape caribou and moose hides (Charlie Peter Charlie: 10/07/1998, Peter Tizya: 04/0801998). Peter Tizya observed that such small tabular bifaces as those found at Dechyoo Njik could be used to soften beaver, muskrat or calf skins (04/08/1998). No calf remains were present in the faunal assemblage of the site, but a few beaver and many muskrat bones were identified.

Tabular bifaces were principally used for scraping caribou hides at Klo-kut and Rat Indian Creek, while at Dechyoo Njik, they probably served mostly to scrape muskrat hides. On this basis, I decided to compare the metrical attributes of the complete and broken specimens of the three sites in order to verify whether or not there is a direct relationship between the general size of the tabular bifaces and the types of skins that were scraped with them. Because of the very small sample of tools from Dechyoo Njik, no statistical method of analysis was used. The metrical attributes of the tools from the three sites are compared in Table 27. The Klo-kut specimens are generally smaller than those found at Rat Indian Creek and Dechyoo Njik, while the Rat Indian Creek tools are the largest of all. However, there seem to be a great degree of variation in the size of those tools in all locations and at both the Klo-kut and the Rat Indian Creek sites, there are tabular bifaces as small as those found at Dechyoo Njik. The variations in size could be a consequence of resharpening procedures. If we consider the thickness of the tool, although those from Klo-kut are thicker, the means thickness for the tabular bifaces from Rat Indian Creek and Dechyoo Njik is exactly the same. As a result of those comparisons, it appears that the size and the thickness of the tabular bifaces from Dechyoo Njik are not unusually small. In fact, there is no correlation between the size or the thickness of the tools and the size and/or fragility of the hides scraped with them.

A major distinction between the coarse stone industry from Dechyoo Njik and those from Klo-kut and Rat Indian Creek is the near total absence, at Dechyoo Njik, of cobble spalls. Those were found in large quantities at both Porcupine sites (Le Blanc 1984: 238-241; Morlan 1973: 251-257). Cobble spalls were used to scrape hides (Morlan 1973: 251) or butcher caribou; they were mostly expedient tools (Le Blanc, pers. comm., 1999). The cobbles used to produce the spalls were not available at Dechyoo Njik, as opposed to the other sites where raw material could be found on the point bars and beaches of the Porcupine River (Le Blanc 1984: 412). This might well be the reason why people did not produce those tools at Dechyoo Njik, and used specialized tabular bifaces exclusively. It is also possible that these rough tools were not needed at Dechyoo Njik, since only fish, migratory waterfowl and small mammals were taken.

As for the lithic tools, the osseous industry from Dechyoo Njik is largely comparable with those from Klo-kut and Rat Indian Creek. In all cases, the main source of raw material came from caribou bone and antler. Bone cores were mostly derived from caribou metatarsals (Le Blanc 1984: 314). Longitudinal and transverse reduction by grooving and splintering were used in order to produce suitable blanks for the production of various implements. Although transverse reduction was not directly identified at Dechyoo Njik, due to the absence of antler cores or blanks, this technique was probably used in association with longitudinal reduction for the production of antler objects, as it was at Klo-kut and Rat Indian Creek (Le Blanc 1984; Morlan 1973). In all three sites, scraping, whittling, polishing and incising constituted the main techniques used in order to shape and finish the tools (Le Blanc 1984: 310-311; Morlan 1973: 274-276).

There is a significant difference between the number of cores, blanks and reduction by-products collected at Dechyoo Njik and those recovered at Klo-kut and Rat Indian Creek. Evidence of early stages of tools production are much more common at the latter sites. As both locations were major caribou hunting camps, raw material was a direct by-product of the hunt and was available in great quantities. This is probably why manufacturing activities were common at both Porcupine sites. Parts of these activities were probably carried out in anticipation of future times, when raw material would no be so readily available.

The types of tools produced at Dechyoo Njik, Klo-kut and Rat Indian Creek are similar, although a greater variety of tools was produced at the two latter. Table 28 presents the classes of osseous artifacts represented at the three locations. Of the 29 classes listed, 22 were present at Rat Indian Creek, 20 were collected at Klo-kut, and only seven were represented at Dechyoo Njik. Among the tools found both at Klo-kut and Rat Indian Creek, but that are absent from Dechyoo Njik are beamers, end-of-bone scrapers, end-notched antler beam, modified teeth, objects with double bevelled margins and pointed antler objects. As Dechyoo Njik was not used for caribou hunting, it is possible that tools such as beamers and end-of-bone scrapers, which are large scraping tools used for the processing of caribou hides (Morlan 1973), were simply not required at the site.

Table 25. Comparisons of Metrical Attributes for the Modified Flakes from the Klo-kut, Rat Indian Creek and Dechyoo Njik Sites

Site	N	Length	Width	Thickness	Weight
Klo-kut*	519	30.0	21.9	6.3	5.0
Rat Indian Creek**	725	23.4	21.8	4.5	2.9
Dechyoo Njik	5	24.7	19.1	4.5	2.5

* Compiled from Morlan 1973 (Does not include microscopically retouched flakes)
** Compiled from Le Blanc 1984

Table 26. Comparison of Metrical Attributes for the Scrapers from the Klo-kut, Rat Indian Creek and Dechyoo Njik Sites

Site	N	Length	Width	Thickness	Weight
Klo-kut*	39	27.3	23.1	8.1	6.5
Rat Indian Creek**	86	36.9	29.5	7.0	8.0
Dechyoo Njik	3	31.7	26.0	6.7	6.5

* Compiled from Morlan 1973
** Compiled from Le Blanc 1984

Table 27. Comparison of Metrical Attributes with Ranges for the Tabular Bifaces from the Klo-kut, Rat Indian Creek and Dechyoo Njik Sites

Site	N	L	r	W	r	T	r	Wt	r
Klo-kut*	23	47.8	14-89	52.6	2-94	5.3	2-10	20.0	2-94
Rat Indian Creek**	10	80.7	55-119	93.5	66-120	9.4	5-15	103.2	30-275
Dechyoo Njik	3	63.8	55-72	99.9	94-107	4.5	4-6	40.0	39-41

* Compiled from Morlan 1973, p. 259, Table 48 (unshaped *tci-de-tho*)
** Compiled from Le Blanc 1984, p. 285, Table 110

Table 28. Classes of Bone and Antler artifacts Represented at the Klo-kut, Rat Indian Creek and Dechyoo Njik sites

Class	Dechyoo Njik	Klo-kut*	Rat Indian Creek**
Antler Objects with Gouge Holes			1
Awls	10	39	56
Beamers		19	9
Blunt-ended Antler Object			1
Broad Triangular Knobbed Objects			4
Broadnosed Objects			4
Creasers		15	
Curved Antler Band			1
End-of-Bone Scrapers		1	3
End-notched Antler Beam		3	1
Fish Hooks		2	
Fish Lures		3	
Gaming Pieces		4	
Misc. retouched bone and Antler Artifact Fragments	7	6	29
Modified Teeth		3	8
Needles		15	
Objects with Double Bevelled Margins		3	5
Pendants			5
Pointed Antler Object		2	1
Projectile Points			
Unbarbed	4	5	5
Unilaterally Barbed	2	11	15
Bilaterally Barbed		1	1
Blunt-headed	1	2	
Leister Barbs	1	2	2
With Knobbed Stems		5	
Fragments	3	31	20
Snowshoe Netting Neddle			1
Spatulate-tipped Objects			3
Spoons			3

* Compiled from Morlan, 1973
** Compiled from Le Blanc, 1984

Dechyoo Njik and the Land Use Patterns during the Klo-kut Phase

Since very few Late Prehistoric sites have been excavated in the northern Yukon, very little can yet be said about the land use patterns adopted by people. However, the investigation of Dechyoo Njik does provide new information concerning the subsistence strategy of Native people during the Klo-kut Phase, and allows for some general observations.

Since, in the northern Yukon, many animal species (i.e., caribou, waterfowl and fish) are migratory animals and are not accessible throughout the year, it is likely that the subsistence strategy and settlement patterns of people during the Klo-kut Phase were strongly determined by resource availability. People had to possess a deep knowledge of the annual cycles of the fauna in order to estimate where and when the animals would be available and to select the most appropriate locations and techniques to catch them in an efficient manner. In the archaeological record, this situation is expressed by the direct relationship that exists between the geographical location of the sites, their function(s) and the season(s) of their occupation. As caribou was the most important resource for the Vuntut Gwitchin, it is probable that most effort was concentrated in hunting these animals. The presence of large specialized caribou hunting camps such as Klo-kut and Rat Indian Creek tends to confirm this.

Both the Klo-kut and the Rat Indian Creek sites are located on the Porcupine River, and caribou remains represented 92% and 98% respectively of the Klo-kut Phase component (Kolar 1980; Morlan 1973), thus indicating that caribou hunting was the only subsistence activity in which people were extensively involved. Both sites were occupied in the spring time (Kolar 1980: 23; Morlan 1973: 441), when caribou were travelling from their wintering area south of the Porcupine River, to reach their calving grounds located on the Arctic Coastal Plain. Apparently, Rat Indian Creek was also occupied in the winter time, although the caribou wintering area usually does not include the region as far north as the Porcupine River. It is probable that during the winter occupation, people had to supplement their diet with other resources (Kolar 1980: 21). Apparently, caribou was also secured in the fall in the area north of the Old Crow Flats, where large surrounds were built in order to capture the animals. Richardson (1969: 232) writes that John Bell, a Hudson's Bay Company trader, visited some of these structures in 1840 and he estimated them to be at least a hundred years old, thus establishing that caribou fences were used during the Klo-kut Phase. Caribou was also hunted in winter in the area located south of the Porcupine River (Big Joe Kay, cited in Balikci 1963: 29), where at least part of the Porcupine herd generally lives at that time of the year.

Dechyoo Njik, for its part, was visited in the summer for the exploitation of various resources known to be generally abundant on the Old Crow Flats area at that time of the year. Although fishing is thought to have constituted the main activity at the site, waterfowl and muskrat are present in sufficient proportions to suggest that the site was used as a multi-functional location. It is also very likely that berry picking was carried out from the site. Only one caribou was identified in the assemblage. In fact, MlVm-4 was occupied in the summer when caribou was unavailable in the region, thus suggesting that the site was used as a location where complementary, if not alternative, resources were gathered during the absence of caribou in the area.

So far, the archaeological data agree with the information provided by the early historical accounts, ethnographic documents and oral history interviews concerning the annual cycle and subsistence patterns of the Vuntut Gwitchin. Of course, the archaeological data are limited, and information is mainly available for only two particular seasons of the year that is, the spring and the summer. More investigation will be necessary in order to complete the picture and to fully understand the cultural adaptation of the Late Prehistoric people to their environment.

Concluding Statement

The purpose of this study was to understand the pre-contact/contact land use patterns in the Old Crow Flats area. The archaeological investigation of a site (MlVm-4) located in this area was the main method used in order to meet this objective. In addition, analogies (mostly direct historical) derived from oral history, early historical accounts and ethnographic documents were used in order to interpret the archaeological assemblage from Dechyoo Njik and to complement the information provided by the archaeological investigation.

The analysis of the remains from Dechyoo Njik revealed that the site was occupied over a relatively long period of time. Two different periods of occupation have been identified. The earliest component is culturally affiliated with the Klo-kut Phase in the northern Yukon, which started around A.D. 700 and lasted until the contact period; the second occupation took place during the Historic Period probably around 1880 A.D. or thereafter. The study of the faunal remains demonstrated that the site was a multi-functional location, mainly used for the acquisition of fish as well as migratory waterfowl and muskrats. Dechyoo Njik was a summer camp probably occupied between the late spring and mid-August. The technological models used to analyze the lithic and osseous industries at Dechyoo Njik helped to understand the nature of the technological system associated with the pursuit of the various activities carried out at the site. Also, the comparisons between Dechyoo Njik, Klo-kut and Rat Indian Creek provided a better understanding of the subsistence strategy and land use patterns of Native people during the Klo-kut Phase. Finally, the analogical approach has proved to be very useful throughout the study. Although, the archaeological data were often too incomplete for the analogies to be tested upon it, the use of oral history, early historical writtings and ethnographic documentation truly enhanced the results of the study, by providing information that helped to understand the material record from MlVm-4 and to complete the picture of what life might have been at such a location.

REFERENCES CITED

Anglican Church

1987 *Indian Name of Mountains, Rivers and Places where the People Camped.* Yukon Archives, 7 pages.

Asher, Robert

1961 Analogy in Archaeological Interpretation. *Southwestern Journal of Anthropology*, Vol. 17: 317-325.

Balikci, Asen

1963 *Vunta Kutchin Social Change.* Northern Coordination and Research Centre, No. 63-3, Ottawa.

Banfield, A.W.F.

1974 *The Mammals of Canada.* Published for the National Museum of Natural Sciences, University of Toronto Press, Toronto.

Bryan, J.E.

1957 *Old Crow, Y.T., Muskrat Investigation March-April, 1957.* Canadian Wildlife Service, Aklavik (N.W.T.).

Butler, V.L.

1990 Distinguishing natural from cultural salmonid deposits in Pacific Northwest North America. Ph.D. dissertation, University of Whashington, University microfilms, Ann Arbor.

Carlson, Roy L.

1994 Trade and Exchange in Prehistoric British Columbia. In *Prehistoric Exchange Systems in North America,* edited by Timothy G. Baugh and Jonathon E. Ericson, Plenum Press, New York, Chapter 11.

Cass, E.E., and M.D. Cass

1958 *Some Observations on the Loucheux Indians. Their Costumes and Stories.* Tape No. 1, Canadian Ethnology Service, Canadian Museum of Civilization.

Charlie, Charlie Peter, Steven Frost and Charlie Thomas

1998 Interviewed by author. Tape recording. Dechyoo Njik (MlVm-4), Yukon Territory, 10 July 1998.

Cinq-Mars, Jacques

1991 Appendix I: NOGAP AMS Dates. In *NOGAP Archaeology Project: an Integrated Archaeological Research and Management Approach,* ed. by Jacques Cinq-Mars and Jean-Luc Pilon, Canadian Archaeological

Association, Occasional Paper No. 1, pp. 149-154, Victoria.

Dall, William H.
1870 *Alaska and its Resources.* Vol. I, Lee and Shepard, Boston.

Franklin, Sir John
1828 *Narrative of a Second Expedition to the Shores of the Polar Sea, in the years 1925, 1926 and 1927. Including and account of the progress of a detachment to the eastward by John Richardson*, J. Murray, London.

Gould, R.A. and P.J. Watson
1982 A Dialogue on the Meaning and Use of Analogy in Ethnoarchaeological Reasoning. *Journal of Anthropological Archaeology*, Vol. 1, pp. 355-381.

Graburn, Nelsson H.H., and B. Stephen Strong
1973 *Circumpolar Peoples: an Anthropological Perspective.* Good Year Regional Anthropology Series, Pacific Palisade (California).

Gwich'in Renewable Resource Board
1997 *Nanh'Kak Geenjit Gwich'in Ginjik. Gwich'in Words abuot the Land.* ed. by Alan Fehr, Nicole Davis and Scott Black, Gwich'in Renewable Resource Board, Inuvik.

Hodges, F. W., ed.
1910 Vuntakutchin. *Bulletin of the Bureau of American Ethnology*, Vol. 30(2), pp. 882-884.

Howard, H.
1929 The avifauna of Emeryville Shellmound. *University of California Publications in Zoology*, Vol. 32, Berkeley, pp. 301-394.

Hughes, O.L.
1972 *Surficial Geology of Northern Yukon Territory and Northwestern District of Mackenzie, Northwest Territories.* Geological Survey of Canada, Paper 69-36, Ottawa.

Irving, Laurence
1960 *Birds of Anaktuvuk Pass, Kobuk, and Old Crow: a Study in Arctic Adaptation.* Bulletin of the U.S. National Museum, Washington, No. 217.

Irving, William N., and Jacques Cinq-Mars
1974 A Tentative Archaeological Sequence for Old Crow Flats. *Arctic Anthropology*, Vol. XI, Supplement, University of Wisconsin Press,

pp. 65-81.

Jakimchuk, R.D.

1971 A Study of the Porcupine Caribou Herd. *Northwest Project Wildlife Studies*, Vol. 1, Renewable Resources Consulting Service LTD.

Jakimchuk, R.D., E.A. DeBock, H.J. Russel, and G.P. Semenchuk

1974 A study of the Porcupine Caribou Herd, 1971. In *The Porcupine caribou herd--Canada,* ed. by R.D. Jakimchuk. Canadian Arctic Gas Study Limited, Biological Report Series, Vol. 4, Chaper 1.

Jones, Andrew K.G.

1984 Some Effects of the Mammalian Digestive System on Fish Bones, in Desse-Berset, N. (ed.), 2nd fish osteoarchaeology meeting, CNRS. *Centre de recherches archéologiques, Notes et Monographies Techniques* 16, pp. 61-65.

Jopling, A.V., W.N. Irving and B.F. Beebe

1981 Stratigraphic, Sedimentological and Faunal Evidence for the Occurrence of Pre-Sangamonian Artefacts in Northern Yukon, *Arctic*, Vol. 34, No. 1, pp. 3-33.

Kassi, Mary

1998 Interviewed by author. Tape recording. Old Crow, Yukon Territory. 2 August 1998.

Kelsall, J.P.

1968 *The Caribou.* Dept. of Indian Affairs and Northern Development, Canadian Wildlife Service, Ottawa.

Kirkby, Rev. W.W.

1863 The Indians of the Youcon. *Explorations in the Interior of the Labrador Peninsula*, Vol. 2, ed. by H.Y. Hind, London, Appendix III.

Kolar, John C.

1980 *Faunal analysis of the Rat Indian Creek site (MjVg-1).* Unpublished report on file, Northern Yukon Research Programme, Dept. of Anthropology, University of Toronto.

Krech, Shepard.

1976 The Eastern Kutchin and the Fur Trade, 1800-1860. *Ethnohistory,* Vol. 23, No. 3, pp. 213-235.

Le Blanc, Raymond J.

1994 *The Crane Site and the Palaeoeskimo Period in the Western Canadian Arctic.* Canadian Museum of Civilization, Mercuries Series, Archaeological Survey of Canada, Paper No. 148, Ottawa.

1984 *The Rat Indian Creek Site and the Late Prehistoric Period in the Interior Northern Yukon.* National Museum of Man, Mercury Series, Archaeological Survey of Canada, Paper No. 120, Ottawa.

1986 *Report of Field Activities - NOGAP 1985: Northern Yukon-Western Mackenzie Delta*, Report on File, National Museum of Man, Archaeological Survey of Canada, Ottawa.

Leechman, Douglas

1954 *The Vanta Kutchin.* Bulletin of the National Museum of Canada, No. 130, Ottawa.

Lemmen, Donald S. et al.

1994 Late Glacial Drainage Systems along the Northwestern Margin of the Laurentide Ice Sheet. *Quaternary Science Reviews,* Vol. 13, pp. 805-828.

Lindström, Susan

1996 Great Basin Fisherfolk: optimal diet breadth modeling the Truckee River aboriginal subsistence fishery. In *Prehistoric Hunter-Gatherer Fishing Srategies*, ed. by Mark G. Plew, pp. 114-179, Boise State University, Idaho.

Lyman, R. Lee

1994 *Vertebrate Taphonomy.* Cambridge Manuals in Archaeology, Cambridge University Press.

Magne, Martin P.R.

1989 Lithic Reduction Stages and Assemblage Formation Processes. In *Experiments in Lithic Technology,* ed. by Daniel S. Amick and Raymond P. Mauldin, pp. 15-32, Bar International Series 528, Oxford.

Mason, Michael H.

1924 *The Arctic Forests.* Hodder and Stoughton Limited, London.

McFadyen, Annette Mosher

1996 *Who Lived in this House? A Study of Koyukuk River Semisubterranean Houses.* Canadian Museum of Civilization, Ottawa.

McFee, R.D.

1981 Caribou Fence Facilities of the Historic Yukon Kutchin. In *Megaliths to Medicine Wheels: Boulder Structures in Archaeology,* ed. by M. Wilson, K.L. Road, and K.J. Hardy, Proceedings of the Eleventh Annual Chacmool Conference. Calgary, University of Calgary Archaeological Association, pp. 159-170.

McKennan, Robert

1965 *The Chandalar Kutchin.* Arctic Institute of North America, Technical Paper No. 17, Montréal.

Morice, A.G.

1910 *The Great Déné Race.* The Press of the Mechitaristes, Vienna.

Morlan, Richard E.

1972a *The Cadzow Lake site (MjVg-1): a multi-component historic Kutchin camp.* Museum of Man, Mercury Series, Archaeological Survey of Canada, Paper No. 3, Ottawa.

1972b *NbVk-1: an historic fishing camp in Old Crow Flats, northtern Yukon Territory.* National Museum of Man, Mercury Series, Archaeological Survey of Canada, Paper No. 5, Ottawa.

1973 *The later prehistory of the middle Porcupine drainage, northern Yukon Territory.* National Museum of Man, Mercury Series, Paper No. 11, Ottawa.

Murray, Alexander H.

1910 *Journal of the Yukon 1847-48.* Publications of the Canadian Archives, No. 4.

Nagy, Murielle Ida

1994 Yukon North Slope Inuvialuit Oral History. *Occasional Papers in Yukon History*, No.1, Tourism Heritage Branch, Yukon.

O'Leary, Beth

1996 The Structure of a Salmon Resource: The Souther Tutchone Fishery in the Southwest Yukon, Canada. In *Prehistoric Hunter-Gatherer Fishing Stategies,* ed. by Mark G. Plew, pp. 6-24, Boise State University, Idaho.

Osgood, Cornelius

1970 *Contributions to the Ethnography of the Kutchin.* Yale University Publications in Anthropology, No. 14, Reprinted by Human Relations Area Files Press, New Haven.

Oswalt, E.T. and J. P. Senyk

1977 *Ecoregions of Yukon Territory.* Fisheries and Environment Canada, Canadian Forestry Service.

Petitot, Émile

1970 Les Indiens Loucheux. *Les Amérindiens du nord-ouest canadien au 19ème siècle selon Émile Petitot,* Vol. II. ed. by Donat Savoie, Ministère des Affaires indiennes et du Nord canadien, Ottawa.

Richardson, Sir John

1969 *Arctic Searching Expedition: A journal of a boat-voyage through Rupert's Island and the Arctic Sea, in search of the discovery ships under the command of Sir John Franklin.* Greenwood Press Publishers, New York.

Rostlund, Erhard

1952 *Freshwater Fish andFishing in Native North America.* University of California Publication in Geography, Vol. 9, University of California Press, Berkeley and Los Angeles.

Rowe, J.S.

1972 *Forest Regions of Canada.* Department of the Environment Canadian Forestry Service, Publication No. 1300, Ottawa.

Scott, W.B and E.J. Crossman

1973 *Freshwater Fishes of Canada.* Fisheries Research Board of Canada, Bulletin No. 184, Ottawa.

Skoog, R.

1968 *Ecology of the caribou (Rangifer Tarandus Granti) in Alaska.* Unpublished Ph.D dissertation, Dept. of Zoology, University of California, Berkeley.

Steingenberger, L.V., G.J. Birch, P.G. Bruce, and R.A. Robertson.

1974 *Northern Yukon Freshwater Fisheries Studies, 1973.* Environmental-Socal Committe Northern Piepline, Task Force on Northern Oil Development, Report N. 74-20, Ottawa.

Thomas, Charlie

1998 Interviewed by author. Tape recording. Old Crow, Yukon Territory, 30 July 1998.

Tizya, Peter

1998 Interviewed by author. Tape recording. Old Crow, Yukon Territory, 4 August 1998.

Vanstone, James W.

1981 Athapaskan Clothing and Related Objects in the Collections of Field Museum of Natural History. *Fieldiana Anthropology*, New Series No. 4. Field Museum of Natural History, Chicago.

Vanstone, James W., and Joan B. Townsend

1970 Kijik: An Hitiric Tanaina Indian Settlement. *Fieldiana Anthropology*, Vol. 59, Field Museum of Natural History, Chicago.

Vuntut Gwitch'in.

1997 *Old Crow: Land of the Vuntut Gwitch'in*. Hp. 1996 [copyright]. Online. Industry Canada. Available: http://yesnet.yk.ca/schools/czg/vuntut/index.html. 12 Avril 1997.

Wahl, H.E. et al.

1987 *Climate of Yukon*. Environment Canada, Atmospheric Environment Service, Climatological Studies, No. 40, Minister of Supply and Services Canada, Ottawa.

Wein, Leanor E., and Milton M.R. Freeman

1995 Frequency of Traditional Food Use by Three Yukon First Nations Living in Four Communities. *Arctic*, Vol. 48, No. 2, pp. 161-171.

Wheeler, Alwyne, and Andrew K.G. Jones

1989 *Fishes*. Cambridge Manuals in Archaeology, Cambridge University Press.

Whitthoft, John

1967 A History of Gunflints. *Pennsylvania Archaeologist*, Vol. 36, No. 1-2, Gettysburg, pp. 12-49.

Whymper, Frederick

1869a *Travel and Adventure in the Territory of Alaska*. Harper and Brothers Publishers, New York.

1869b Russian America or "Alaska". The Natives of the Youcon River and Adjacent Country. *Transactions of the Ethnological Society of London*, Vol. 7, pp. 167-185.

Woodward, Arthur

1960 Some Notes on Gun Flints. *The Missouri Archaeologist*, Vol. 22, pp. 29-39.

1965 *Indian Trade Goods*. Oregon Archaeological Society, Publication No. 2, Binfords and Mort, Portland.